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FIFTH

ANNUAL REPORT

N.Y. ACADEMY OF MEDICINE LIBRARY

OF THE

STATE BOARD OF HEALTH

LANE MEDICAL LIBRARY

WISCONSIN.

1880.

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CONTENTS.

1. General Report of the Board..... v
2. Secretary's Report..... xv
3. General Hygienic Knowledge a Necessity for the People, by H. P. Strong, M. D..... i
4. Recreation as a Sanitary Agent, by Rev. J. W. Hageman..... ... 18
5. School Hygiene, and What the Teacher can do to Promote it, by Prof. T. W. Chittenden..... 30
6. The Management of Contagious Diseases in the City of Milwaukee, by O. W. Wight, M. D..... 64
7. Diseased Meat, by H. P. Wenzel, M. D..... 74
8. Kerosene, by J. T. Reeve, M. D..... 91
9. Extracts from Special Correspondence 105
10. Extracts from Reports of Local Boards..... 132

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MEMBERS.

E. L. Griffin, M. D., *President*, Fond du Lac.

J. T. Reeve, M. D., *Secretary*, Appleton.

John Favil, M. D., Madison.

Solon Marks, M. D., Milwaukee.

Gen. James Bintliff, Darlington.

H. P. Strong, M. D., Beloit.

G. F. Witter, M. D., Grand Rapids.

GENERAL REPORT OF THE BOARD.

OFFICE OF THE STATE BOARD OF HEALTH OF WISCONSIN,
October 31, 1880.

To his Excellency, W. E. SMITH,
Governor of Wisconsin:

SIR — In accordance with the provisions of law under which this board is organized, we have the honor to present the following fifth annual report.

In the accompanying report of the secretary, to which you are respectfully referred, will be found a detailed statement of the general work of the board, and of the means by which it is executing the important trust committed to its charge. That report will show that the work of the board has reached a larger proportion of the state than during any previous year of its history, and we trust that as its labors have been extended its usefulness has likewise been increased.

THE GENERAL HEALTH OF THE STATE

has been on the whole better than during the preceding years of the board's existence, though we still have to mourn the sacrifice of many valuable lives, and to witness a great amount of suffering which might have been avoided had the knowledge of sanitary science been more widely diffused among and heeded by the people. Among the chief causes of mortality in the state during the year covered by this report,

DIPHTHERIA AND SCARLET FEVER

have stood pre-eminent, the former being charged by the returns of the health authorities of the several towns of the state with having caused 1,780 deaths, and the latter as being the cause of

390; the aggregate of these numbers being more than four times that of the deaths due to small-pox, typhoid fever, measles and whooping cough collectively.

It is to be hoped that in the progress of medical and sanitary science some means will be found by which these diseases shall be robbed of their present terrors, and brought under control as certainly as has that scourge of former days, small-pox, which, though it still lingers among us, and breaks out into occasional epidemics where vigilance in regard to its prevention relaxes under a fancied security, no longer counts its victims by thousands annually. Small-pox is indeed a disease which sanitarians believe to be capable of being perfectly controlled; yet in the early part of the last century it alone caused the death of one-tenth of the whole population of central Europe, and the life-long disfigurement of one-tenth more. We have not yet the knowledge which will enable us as efficiently to control the the ravages of diphtheria and scarlet fever, and, until such knowledge has been obtained, we must fight these destroyers with the best weapons at our command; no insignificant portion of the work of this board has been to endeavor to spread broadcast among our citizens a knowledge of the most efficient of these weapons, and the methods of using them to the best advantage. That there is much encouragement for persistent effort in this direction is proven by letters which frequently reach the office of the board, testifying to the benefits already received by many localities.

OTHER DISEASES.

Typhoid fever has prevailed to a somewhat greater extent, and its type has been more serious than during the year 1879, while measles and whooping cough have been much less frequent.

Small-pox has caused only two deaths during the year; although the disease has been brought into the state from without on three several occasions, its spread in each case has been controlled and confined to the families in which it first made its appearance, by strict isolation of the patients and quarantine of the infected premises. And just here a word of warning seems eminently in *place. While we are* comparatively free from the attacks of this

dreaded and loathsome disease, we are too apt to neglect the employment of the only precaution which has ever proven effective as a safeguard against its ravages, *i. e.*, vaccination. Parents, thinking that there is no immediate danger, put off the performance of the operation upon their children, and others who have been vaccinated in early life forget that the protection then acquired may wear out with advancing years, and neglect to assure themselves of its continued efficiency by the only means by which this can be tested, *i. e.*, revaccination; and thus a large number of unprotected individuals accumulates in the midst of a community, constituting an ever-present source of danger. By-and-bye a case of small-pox comes into the vicinity through some one of the accidental chances spoken of in the secretary's report, or it may be through some channel which cannot be traced out, and one after another those who are susceptible are seized upon, until the malady assumes the proportions of a full-fledged epidemic; every one takes fright, business comes to a standstill, and all the interests of the place receive a check from which recovery is always very slow, if it takes place at all. Then every one becomes anxious for vaccination, which is performed on a large scale, in some cases perhaps not with the thoroughness requisite for its full efficiency; and at last the disease subsides or dies out for want of further material, after which the people begin to count up the cost in money and life.

Now all this — and scores of places can testify that we have drawn no fancy sketch — can well and easily be avoided by the simple method of making vaccination compulsory. We are well aware that there are many among our citizens, especially among those of European birth, who are by no means ready to accept this conclusion, and it may also be the case that the community as a whole is not yet prepared for direct legislation for this purpose. But our school boards all over the state should see that no child is admitted to any public school without good and sufficient evidence that vaccination has been properly performed; the proprietors of large manufacturing establishments of all kinds should keep a proper oversight of their employes in this regard, and, the subject being in this and other ways kept before the people, the way may and *probably will be* finally opened for efficient action.

General Report of the Board.

ILLUMINATING OILS.

As was stated in our last annual report, our attention having been attracted by the frequency with which so-called kerosene "accidents," resulting in serious personal injury or loss of life, were reported in the columns of our newspapers, the cause of such accidents was made a subject of special study and investigation by the board. In the course of this inquiry a large amount of evidence was collected concerning the character of the illuminating oils then in general use throughout the state, and it was ascertained that, while stringent laws regulating the sale and use of such oils were enforced in the states adjoining our own, Wisconsin was practically without any law on the subject, and was, as a consequence, the recipient and consumer of oils rejected elsewhere as unfit for use because dangerous to property and life.

It was further ascertained that kerosene accidents were much more frequent in their occurrence in this state than in those states which were protected by statutes regulating the sale of petroleum oils. Under such circumstances the board felt it to be a duty to urge, in the interests of the property and lives of our citizens, that protection should be given to the people by proper legislation on the subject, and was gratified by the enactment of a statute which, thought not in all respects such as met its fullest approval, was, nevertheless, one which it was felt would secure a reasonable degree of safety in the use of one of the commonest necessities of daily life in nearly every household in the state.

It affords the board much pleasure to call attention to the noteworthy change, in the almost complete disappearance of the accounts of kerosene accidents which were of such frequent and painful occurrence in the columns of the Wisconsin press prior to the enactment of this law. A record like this is the strongest possible justification of the action of the board.

As has heretofore been the custom, copious and interesting extracts from the correspondence of the board throughout the state are appended to the report of the secretary. These, in many instances, show the progress already made in sanitary work in various localities, while in yet other cases they bring to light various local

causes of disease, or point the way for new effort for its prevention.

Some special papers on sanitary subjects will also be found, which have been mostly prepared by gentlemen who, though not connected with the board, have special fitness for the discussion of the subjects presented. The board takes this opportunity to return sincere thanks to the gentlemen in question for the kindness which has enriched the report with information that cannot fail to be of special value to the people on whose behalf they have labored.

Among the papers prepared for and presented with this report is one by Dr. H. P. Strong, a member of the board, on

GENERAL HYGIENIC KNOWLEDGE A NECESSITY FOR THE PEOPLE,

in which the writer traces the slow progress of hygienic knowledge, and after giving a general definition of hygiene, it is shown how largely the necessity for this knowledge enters into our physical, moral and intellectual well-being. The necessity for organized and united action is shown, inasmuch as an uncontrolled individual may neutralize the best efforts of his neighbors, and so a whole community be caused to suffer for the fault of one. Only state or national control can affect the greatest good of the greatest number.

The relation hygiene occupies to the several epochs of life are briefly given, and advancement is proven by the history and statistics of the past as contrasted with the present partial immunity from the scourges of olden times. Attention is called to the fact that while our necessities equal those of other nations, yet some, notably England, is far in advance of us in the machinery necessary to a fair education of the public mind, and that we are lamentably behind that nation both in governmental supervision and authority over sanitary questions, and in the general knowledge of the subject possessed by the people.

The subject is briefly treated from a commercial or financial standpoint, from which we find that proper hygienic knowledge is as necessary to the body politic as it is from a consideration of the humanitarian aspect, and then follows a series of propositions call-

ing attention to the necessity for more general information, and indicating more in detail some of the things which it is necessary to know.

The paper closes with the suggestion that hygiene should be included in the curriculum of our system of common school education, even though it exclude some studies of less practical importance.

Another paper is upon

RECREATION AS A SANITARY AGENT,

by Rev. J. W. Hageman, of Wausau. The writer takes the ground that recreation is a necessity to a healthy life, and points out the various methods in which it may be had; he recognizes the fact that what is labor for one may be the best of amusement for another, and advises that, in taking recreation, as complete a change as is practicable from the customary pursuits of the individual should be secured; that some active outdoor life be entered upon by the sedentary, while some quiet indoor occupation, or even absolute and entire rest of body and mind, should be the aim of those whose usual vocations require great exertion. Various methods of obtaining recreation are sketched or suggested, and the mistake sometimes made of supposing, that because a mode of life varies from the ordinary routine, it must necessarily be recreating, is pointed out. True recreation can never be a bore, in the writer's opinion; and whenever any occupation or excursion entered upon for amusement's sake becomes dull and tiresome, it will fail of being recreative in any right sense, and may better be abandoned so far as that object is concerned. The paper closes with an appeal for recreation for all in the interest of the higher life.

Another paper has been prepared by Dr. H. P. Wenzel, of Lomira, upon

DISEASED MEAT.

The various forms of disease which affect animals raised for human food are sketched, especially those which affect the character of their flesh, and the danger of using meat from animals so affected is pointed out. The parasites which inhabit the muscular and other tissues of animals are next treated of, particular attention being

given to such as are known to give rise to disease in the human being; under this head trichiniasis and tape-worm in man are discussed, and the means by which the parasitic creatures producing them may be rendered harmless where their presence is suspected, are pointed out. The question of legislation is then discussed, and references are given to such of the statutes of Wisconsin as bear upon the subject generally.

Prof. T. W. Chittenden, of Appleton, contributes a paper upon

SCHOOL HYGIENE,

and what teachers can do to promote it. The subjects of Ventilation, Light, Seating, Exercise, Oversight of the Playground, Defects of Sight and Hearing, the merits of dry and moist atmospheres, the effects of position, the prevention of contagious disease in schools, and the signs of sickness generally, or those which will justify a teacher in remanding a child for the time being to home care, are all more or less fully discussed, and the writer has aimed to give the conclusions reached by the best and most modern authorities.

This whole subject of the health of the children in our public schools is one that is engaging the earnest attention of sanitarians both in our own country and Europe, at the present time, to a very remarkable extent. Never before has the fact been so clearly realized that the welfare of the world in the near future depends upon the care and pains bestowed upon the education, both physical and mental, of the rising generation. No apology, therefore, seems needed for the prominence given to the subject of schools and their sanitary condition in this and in preceding reports.

In addition to the plans by which the ventilation of existing school houses may be improved, as presented in Prof. C.'s paper, the following, by Dr. Swinburne, of Albany, N. Y., is worthy of adoption, particularly in mild weather: "A very effectual way to secure good ventilation, is to use one-half or even two-thirds of the window space by inserting light frames covered with thin muslin without starch. The changes of air go on as they do in a tent, and the air is rendered as pure as that out of doors. Whenever in the charity hospital we have typhoid or scarlet fever, we simply fill the

window spaces with frames over which thin muslin is stretched, and the purity of the air is surprising."

We are yet very far from perfection in the construction of our school houses or in their furniture. "It cannot be denied," says Dr. Jewett, "that under the present provisions and restraint of the school room, the foundations are laid of many maladies that entail suffering and misery during a longer or shorter period of life. The extent and fatality of preventible diseases, and the inception of germs of future wretchedness and deformity as the result of our present school system, is appalling, and demands a thorough scrutiny and reformation. In cemeteries all over this land are little graves whose inmates have been put there by the ignorance or carelessness of school teachers or trustees."

Hon. John Eaton, commissioner of public education, Washington, D. C., uses the following emphatic language: "It must be confessed that there are school officers who hold their places in comparative ignorance of the principles of education. They have allowed schools to receive and communicate diphtheria, scarlet fever and small-pox. They have permitted unhealthy conditions to multiply around schools, until from them has gone out sickness to desolate neighborhoods. They should be held responsible for all the unnecessary myopia, curved spines and infection due to their ignorance or neglect. A great step might be taken immediately by giving sanitation its proper position in our normal schools, and by giving sanitary subjects proper consideration in teachers' associations and institutes."

By the kindness of Dr. O. W. Wight, health commissioner of the city of Milwaukee, and with the consent of the executive committee of the American Public Health Association, for which organization it was written, we are enabled to present a paper on the

MANAGEMENT OF CONTAGIOUS DISEASE IN MILWAUKEE.

This paper exhibits clearly and forcibly the results which may be attained by sanitary science when upheld by public sentiment, and its teachings are enforced by law. With some modifications, varying with the necessities of different localities, the system presented *by Dr. Wight might* be adopted by every municipal organization in

the state, with the best possible results; and were the principles inculcated by him faithfully carried out in all our villages, towns and cities, a single year would show a marked diminution in the number of victims of contagious disease, and greatly lessened mortality returns from other causes.

A paper on

KEROSENE

has been prepared by the secretary at the special request of the board, with the design of bringing before the people facts in relation to this substance which it is believed will be of general interest. Kerosene is now so extensively employed as a household illuminant, and so many fearful accidents have resulted either from its careless use or from that of an inferior or adulterated article — most often from the two latter causes — that the board feels that information upon this subject should be spread among all classes of our citizens as widely as possible.

In conclusion, the board desires to acknowledge the aid which it has received from the medical profession of the state, who have generally responded promptly to any requests for information concerning the sanitary condition of their respective localities; and from the Wisconsin press, which has given a wide publicity to various circulars and similar publications of the board, and has shown a general interest in its work and a desire to aid its efforts to spread sanitary knowledge among the people.

Appended hereto will be found a communication in the shape of a personal letter to a member of the board, from Prof. George W. Peckham, of the Milwaukee high school, written in reply to certain questions presented to him concerning the study of physiology and hygiene in schools, to which the board desire to give this prominence because of the importance of the subject to which it relates.

Very respectfully,

E. L. GRIFFIN,
JOHN FAVILL,
JAMES BINTLIFF,
G. F. WITTER,
J. T. REEVE,
SOLON MARKS,
H. P. STRONG,
State Board of Health.

General Report of the Board.

MILWAUKEE, October 10, 1880.

MY DEAR DOCTOR — In reply to your request that I should inform you how far the university and the public schools of the state are doing their share in spreading a knowledge of physiology and hygiene, I regret to say little, if anything. The great majority of our higher schools, both private and public, teach so little physiology that there is no sound foundation upon which to give instruction in sanitary science. Let me explain more in detail. The greater number of our higher schools shape their courses of study to meet the requirements of the state university, and, speaking generally, what it requires for admission, they teach. If we enlarge our course, as a general rule those students preparing for the university omit the studies not demanded for admission. The university offers three general courses of study: the general science, the ancient classical and the modern classical. For the first, the science course, it has an entrance examination in Huxley's and Youman's physiology. The time devoted in the schools to preparing in this subject averages one term of four months, a period totally inadequate to obtaining a fair knowledge of this science. For entrance to the classical courses, either ancient or modern, no knowledge in physiology is required. Why students in the scientific course need physiology, while those in the classical courses do not, I am at loss to understand. You will, I presume, suppose that the university itself supplies this lack, but here you are in error. While it offers options in Greek, Latin, German, French, Norse, Icelandic and Anglo-Saxon, there is absolutely no opportunity given a student to acquire even the rudiments of the laws of health; and so far as the university is concerned, a student can graduate from either of the classical courses ignorant both of physiology and sanitary science. As a matter of fact, the tendency of this course on the part of the university is to discourage the study of these two studies, if it does not lead to their entire neglect, by at least one-half of the students (the classical) who attend the university. As a result of this policy, one school in the state has within three months cut down the instruction in physiology from seven (7) months to barely three (3). This would exclude any work in sanitary science and renders the physiological instruction almost without value. Under the laws of this state a graduate of our university may obtain, without examination, a life certificate which qualifies him to teach in any school in the state. Hence it results that the management of large numbers of children may be entrusted to persons ignorant of the simplest laws of health. My experience of the past three years as one of the examiners on the state board of examination, and my general acquaintance with the instruction in this science throughout the state, forces upon me the belief that no subject is so sadly neglected as physiology. This dense ignorance must of necessity exert a prejudicial influence on the well-being of the citizens of the state, and as surely cripple the efforts of both the state and the local boards of health in the direction of sanitary reform. From the practical side, if only for the information that it gives, I think that you will agree with me that it is second in importance *to no other study.*

I remain yours truly,

GEORGE W. PECKHAM

TO SOLON MARKS, M. D.,
Member State Board of Health,
Milwaukee, Wisconsin.

SECRETARY'S REPORT.

To the Board of Health and Vital Statistics of the State of Wisconsin:

GENTLEMEN — The following, my fifth annual report as secretary and executive officer of the State Board of Health, is respectfully presented, it being for the year ending October 31, 1880.

During the year there has been no change either in the constitution of the board or in its officers, the vacancy occasioned by the expiration of Gen. J. Bintliff's term of membership having been filled by his reappointment, while at the annual meeting of the board in January last, Dr. E. L. Griffin was re-elected to the presidency, the secretary being continued in office.

The names and addresses of the several members, with the dates at which their respective terms of membership expire, are as follows:

S. Marks, M. D., Milwaukee, -	term expires February 2, 1881
J. Favill, M. D., Madison, - -	term expires February 2, 1882
E. L. Griffin, M. D., Fond du Lac,	term expires February 2, 1883
G. F. Witter, M. D., Grand Rapids,	term expires February 2, 1884
H. P. Strong, M. D., Beloit, - -	term expires February 2, 1885
J. T. Reeve, M. D., Appleton, -	term expires February 2, 1886
Gen. J. Bintliff, Darlington, - -	term expires February 2, 1887

The following standing committees were appointed at the meeting in January, 1880, for the coming year:

On Finance — Drs. Favill, Marks and Witter.
On Legislation — Gen. Bintliff, Drs. Strong and Witter.
On Printing and Stationery — Drs. Reeve, Favill and Griffin.

On Visitation and Sanitary Inspection of Public Buildings — Gen. Bintliff, Drs. Marks and Reeve. The chairman was authorized to call upon any other members of the board for assistance, whenever it should seem advisable or necessary for the better performance of the work assigned to this committee.

At the same meeting, a committee which had been previously appointed to consider the subject of illuminating oils, with the dangers arising from the domestic use of low grades thereof, and the best means of avoiding or preventing such danger, presented a report, in which it was shown that a very large part of the oil then in use throughout the state of Wisconsin was exceedingly dangerous in character, and that much valuable property and many lives were annually and needlessly lost by its agency, and that the details of many such losses — originating, not in any careless use of the oil, but in actual explosions of lamps in which it had been burning — were in the possession of the committee. It was shown, moreover, that there was not only great danger in using such oils as were then almost universally for sale in the markets of the state, but that there was very general and very just complaint of their illuminating qualities, they being in many instances so heavily loaded with paraffine and other adulterants as to solidify with a very moderate degree of cold in the winter, so that it became necessary to warm the vessels containing it before lamps could be filled; that the lights would smoke and finally go out; and that the people were suffering a grievous evil from the sale and use of such oils, the existing laws of the state affording them no protection whatever.

In view of these facts and in accordance with the instructions of the board, the committee presented the draft of a bill, the passage of which by the legislature would, it was believed, secure an oil so free from impurities as to be a good and satisfactory illuminant, without being oppressively increased in cost, and which would insure a high degree of safety in practical use, if it could not be said to be absolutely safe under any and all circumstances.

The bill provided for the appointment, by the governor, of a suitable person, who should not be in any way interested in the manufacture or sale of illuminating oils, as inspector of all oils

offered for sale or use for illuminating purposes, and for the appointment by the state inspector of a sufficient number of deputies who should act under his instructions and supervision.

That the state inspector and his deputies should examine and test all oils offered for sale or use, branding all that came up to the requirements of the law as approved, and all others as rejected, for illuminating purposes within the state, and that all inspectors should give proper bonds for the faithful discharge of their official duties.

That the tests which an oil must bear in order to be approved, should be the following: 1. It must not give off an inflammable gas or vapor when heated in a covered vessel at any temperature below 140° Fahrenheit. 2. When cooled to the temperature of 20° Fahrenheit, it must remain perfectly clear and transparent during the period of ten minutes of time. 3. That the instrument used in making the first portion of the test should be essentially the same as that for several years employed for the same purpose in the state of Michigan.

Concerning the test prescribed above, it may be said here that the board believed that it was its special province to emphasize the question of safety in use, and that an oil having a flashing point not lower than 140° Fahrenheit would be almost absolutely safe under any conditions likely to be found in an ordinary household. It was conceded, however, that an oil of this grade would be necessarily somewhat expensive in its first cost, and that oil having a flash-test of 120° Fahrenheit would be practically safe, with the exercise of ordinary care and prudence in its use — certainly far safer than the larger part of the oil to be found everywhere in Wisconsin at that time, while its increased cost would be balanced to a great extent by its superior lasting qualities; and that therefore an oil of this grade might be adopted with the certainty that its price would not prove in any way oppressive.

The bill further prescribed a scale of fees for inspection, provided penalties for its violation, and ended with a section allowing sixty days to intervene between its passage and the time when it should take effect.

The report was accepted by the board and the committee dis-

charged, after which the bill above outlined being carefully reviewed and some minor amendments made therein, it was fully approved by the board, and it was decided to make an effort to secure the passage of it, or of some measure of like character, through the legislature, to the end that our citizens might enjoy the same security as to life and property enjoyed by those of states in which proper inspection laws were then in force.

Pending the discussion of the subject, it was ascertained that Hon. J. B. Bennett, of the twenty-third senatorial district, had introduced a bill into the senate also looking to the inspection of illuminating oils. Examination showed that Senator Bennett's bill differed in many particulars from that prepared by this board, and accordingly through the courtesy of that gentleman a conference on the subject was arranged, at which were present not only Senator Bennett, the committee to whom his bill had been referred and the board, but many other gentlemen, members of both branches of the legislature, by and before whom the bill already in the hands of the committee and that prepared by the board were compared and reviewed. At the same time a large amount of evidence was presented of the danger attendant upon the employment of oil such as was then very generally used in the state. Many different instruments for testing oils, including the Tagliabue open cup, commonly known as the "commercial tester," Foster's automatic tester, the English, the Indiana and the Michigan testers, were exhibited, their methods of action shown and their merits and defects fully explained. Soon after this interview the bill prepared by this board was also introduced into the senate by Mr. Bennett. The board subsequently presented an elaborate memorial to the legislature, setting forth the facts concerning the character of the oil then to be had in our markets, and earnestly pleading for such legislation upon the subject as should entirely prohibit the sale and use of illuminating oils of dangerously low grade, representing the urgent necessity of such measures in the interest and for the protection of the lives and property of our citizens.

A law was finally enacted differing in several respects from that *recommended* by this board, yet embodying the features of the bill *recommended by it which* were deemed most essential.

Secretary's Report.

Concerning the practical operation of this law, it may be said that whereas, prior to its taking effect, accounts of accidents more or less serious in their results, originating in kerosene explosions, were of startlingly frequent occurrence in the columns of our newspapers, such records have entirely ceased since the date at which the present statute went into operation.

COST OF COLLECTING VITAL STATISTICS.

In accordance with instructions previously given, the secretary reported that he had inquired into the cost of collecting such vital statistics as under existing laws it is possible to obtain in this state, and that such cost for the year 1879 had been as nearly as could be ascertained, $10,926.70. The report was accepted by the board, which reiterated its conviction that the statistics thus obtained were worthless for any sanitary or scientific purposes, and that statistics having value for such purposes cannot be obtained under present statutes; it was not deemed advisable, however, at present to suggest any legislation for the purpose.

REPORTS FROM LOCAL HEALTH BOARDS.

I have again to report the encouraging fact of an increase in the number of reports made by the clerks of the local health boards throughout the state, and to make note also of the fact that with each year the importance of these returns is becoming more fully appreciated by those officers. While the records of this office for the first years of its existence show that the duty of making reports was, in some sections of the state, almost wholly neglected, and in some others performed only in the most perfunctory manner, they also bear witness to the fact of an increase that has been steady and gratifying in the care taken in the collection of facts, in the interest shown in the work of this board, and in the notes concerning matters of sanitary value and importance, that are not specifically mentioned in the blanks furnished for the purpose of making returns. In addition to the formal returns required by the statute, voluntary communications are often received, both in connection therewith and at other times, extracts from some of which were pre-

sented in the fourth report of the board, and others still form a portion of the present volume. Such extracts and communications indeed bid fair to become an interesting and important feature of our annual publications. Recognizing the difficulties in the way of securing full and accurate data on which to base their reports, we must give these gentlemen credit for the very great pains which the majority of them must have taken to obtain such data, and for the labors which have produced so good results.

There are still some — comparatively few, however — who do not understand that, in default of any more formal organization, the ordinary authorities of any town, village or city constitute the board of health for that locality, and that the duty of making the returns required by this board devolves by law upon the town, village or city clerk. The number of those officials who fail to comprehend this fact happily grows smaller with each successive year, and we now look hopefully for a time when every municipal organization in Wisconsin shall be represented upon our records.

To all clerks of local health boards in Wisconsin circulars have been sent as usual, together with blank forms on which to make proper returns; these blanks are furnished in duplicate, to the end that a copy of each report may be kept on file in the office from which it is sent, and the labor of collecting information in successive years greatly abridged. Copies of the circular and of the blank form on which the returns have been made are here given.

OFFICE OF STATE BOARD OF HEALTH,
APPLETON, WIS., May 1, 1880.

To the Clerk of the Local Board of Health, or the Town, Village or City Clerk:

DEAR SIR — In asking for the regular annual reports from the local health boards, blank forms for making which are herewith enclosed, the State Board of Health takes the opportunity of acknowledging the greatly increased care and pains which have been taken to secure correct results, and also the fact that returns have been received at this office from every county in the state with a single exception, and from a largely increased number of officers. To all who have entered into communication with this office, and especially to those who have furnished information in addition to that required by law, the board return sincere thanks, and trust that those, comparatively few in num-

ber, who have hitherto neglected the duty which the law imposes on them of making the returns required, will give no reason for a charge of willful omission hereafter.

Information now in possession of this board gives reason for fearing that small-pox, a disease from which Wisconsin has for some time past been wholly free, may again be brought into the state. In view of this possibility, and of the fact that in many parts of the state this board is compelled to rely entirely on the clerks of local boards for its knowledge of this and kindred diseases, it is hoped that neither time nor pains will be spared in making the reports to the state board as full and accurate as is possible. The difficulties in the way of executing this task are well understood and fully appreciated by the board, but the advantages of your position for its performance are greater than those of any other officer, and the value of the service rendered to the people of the whole state by its proper execution cannot be over-estimated.

Chapters LVI and LVII, sections 1410 and 1411 of the revised statutes provide that, whether any formal organization have been effected or not, the local authorities duly elected and qualified shall constitute local boards of health, and as such shall exercise all the powers and perform all duties pertaining thereto. Under those provisions, whether special action has been taken or not, you are the clerk of the board of health in your city, town or village, and in that capacity you are required "to report at least once a year to the state board" the transactions of your local board and "such other facts as shall be required," and also "to make special reports" whenever the state board shall call upon you, following the instructions of this office in all cases. Upon this point the law is imperative and explicit. The duty is inseparable from your office, and is to be performed whether any formal organization of the board has been effected or not. Any necessary expense attached to its performance is properly chargeable upon your official account.

The intention of the chapters of the revised statutes already referred to is to bring the state and local health boards into active sympathy and coöperation with each other, and render their union close and efficient. They confer the most ample powers upon the local boards, constituting them the guardians of the people's health, and laying great responsibility upon them in their several jurisdictions.

In accordance with these laws you are requested to fill out the duplicate blanks sent herewith, returning one copy to this office, and placing the other on file in your own for future reference. Duplicates of previous years should be among your official papers, and should prove helpful in making the present returns.

If a health officer has been appointed in your town, as has been constantly recommended by this board, consultation with him, especially in regard to any facts concerning the particular diseases named in the report, will render

your returns more valuable. Any voluntary communication in addition to the more formal report, will be welcome, will receive careful consideration, and will be regarded as confidential if so desired.

In the fourth annual report of this board (a copy of which has been mailed to your address to be placed on file in your office), are published a number of interesting and valuable extracts from such communications as those mentioned above.

Any of the circulars or other publications of this board will be cheerfully forwarded for gratuitous distribution upon application to this office. Many thousands of the circulars on small-pox, diphtheria and scarlet fever have been thus circulated in the state, and the liberal distribution of these circulars is recommended whenever these diseases are prevalent in any community. A circular on the care of infants will also be furnished on application.

By direction of the State Board of Health.

J. T. REEVE, M. D,
Secretary.

ANNUAL REPORT OF THE CLERK OF THE BOARD OF HEALTH FOR THE YEAR ENDING MAY 31, 1880.

To the Secretary of the State Board of Health:

SIR — The territory for which this report is made includes the corporate limits of the[1] ——— of ——— in the county of ———, containing about ——— acres of land. Its population numbers about ——— inhabitants, and is composed chiefly of[2] ———. Their principal occupation is———.

About ——— of the land included in the above limits was originally covered with timber, chiefly ———. About ——— still remains covered with timber, and during the last year the timber has been removed from about ——— acres. There are now under cultivation about ——— acres. The nature of the soil is ———, and the crops chiefly raised are ———. It is[3] ——— watered by the following streams and bodies of water, to wit: ———.

I estimate the number of acres of low or wet land from swamps, etc., to be now about ———. The proportion of this land which is capable of being efficiently drained is ———, and the number of acres of originally wet or low land that have been thoroughly drained during the last year is about ———. In this locality the drinking water is derived chiefly from ———, and the quality of the water is[4] ———; the wells are of the average depth of ——— feet.

The proportion of dwellings having cellars which are wet either habitually or in wet weather is ———.

[1] Insert township, village, or city. [2] Give approximate proportion of nationalities represented. [3] Insert poorly, well, abundantly, etc. [4] Hard or soft.

Secretary's Report.

The average distance of privies from dwelling houses is ——— feet. The average distance of privies from the source of water supply is ——— feet; the least distance in any known case is ——— feet.

The diseases which have been most prevalent in this community during the last year have been ———.

Upon the whole the amount of sickness has been [5] ——— than has averaged for some years past and the number of deaths has been [5] ———.

There have been in this [1] ——— during the last year, to the best of my knowledge and belief:

——— cases of, and ——— deaths from *Small Pox*, and there are now sick with this disease ——— cases.

——— cases of, and ——— deaths from *Diphtheria*, and there are now sick with this disease ——— cases.

——— cases of, and ——— deaths from *Scarlet Fever*, and there are now sick with this disease ——— cases.

——— cases of, and ——— deaths from *Typhoid Fever*, and there are now sick with this disease ——— cases.

——— cases of, and ——— deaths from *Measles*, and there are now sick with this disease ——— cases.

——— cases of, and ——— deaths from *Whooping Cough*, and there are now sick with this disease ——— cases.

The origin of the above cases so far as known was ———.

The diseases prevailing at the date of this report, other than those above enumerated, are ———.

This board of health has appointed Doctor ——— as its health physician. His post-office address is ———. He is paid a salary of $——— per year.

During the past year this board has held ——— regular or special meetings, and its most important acts have been ———.

My post-office address is ———.

Dated ———.

Signature ——— ———.

Clerk of the Board of Health for the [1] ——— *of* ———, *State of Wisconsin.*

Any additional information on matters pertaining to health, written on a separate sheet, will be thankfully received, especially on the following points:

Reports of any cases of disease clearly traceable to local causes; such as impurity of drinking water from decomposing animal or vegetable matter, unhealthy food, stagnant water, etc.

Reports of an extraordinary amount of sickness or of unusual fatality in special localities. Instances of spread of contagious diseases in any unusual manner, etc.

[5] Insert greater or less, giving proportion if possible.

Reports of cases of sickness or of death, the origin of which is clearly traceable to the occupation of the individuals.

Report of unusual sickness or fatality among animals.

Instances of injury to life or property from kerosene oil or other explosive burning fluids.

Any cases of sickness among children caused by defects in school houses, overcrowding, overstudy, etc.

Any epidemic spread or supposed to have been spread through schools.

Your opinion as to the principal sources of danger to the health of the citizens in your locality, and suggestions whereby the local causes of disease may be removed, etc.

Please give here your best estimate of the average cost of each case of sickness in your community, including as follows: Medicine and medical attendance, $——. Hired assistance, $——. Loss of time at its fair value, $——. Also the further cost of each funeral in case of death, $——. (Although great accuracy cannot be expected in the answers to this question, your estimate of the above, however imperfect, is nevertheless desired as having a bearing upon the cost of sickness to the communities and to the state)

In the following list the names of all towns, cities and villages from which reports have been received are arranged in alphabetical order. Their number is 853, as against 795 in 1879, 687 in 1878, and 556 in 1877. Every county in the state is represented in these returns, which are in all respects the fullest and most satisfactory as yet received by the board. From the counties of Ashland, Bayfield, Crawford, Douglas, Dunn, Green, Green Lake, Kenosha, La Fayette, Langlade, Lincoln, Marathon, Milwaukee, Ozaukee, Polk, Price, Racine, Taylor, Washington and Winnebago, twenty in all, the returns are complete, reports having been received from every town; while eighteen other counties, viz.: Adams, Barron, Buffalo, Burnett, Calumet, Chippewa, Door, Juneau, La Crosse, Monroe, Oconto, Pepin, Pierce, Rock, Sauk, Shawano, Walworth and Waushara, lack only one town each of being complete.

LIST OF CITIES, TOWNS AND VILLAGES FROM WHICH REPORTS HAVE BEEN MADE FOR THE YEAR ENDING MAY 31, 1880.

Adams County—Adams, Big Flats, Dell Prairie, Easton, Leola, Lincoln, Monroe, New Chester, New Haven, Preston, Quincy, *Richfield,* Rome, Springville, Strong's Prairie.

Ashland County — Ashland, Butternut.

Barron County — Barron, Cedar Lake, Clinton, Dallas, Maple Grove, Prairie Farm, Shetek, Stanfold, Sumner.

Bayfield County — Bayfield.

Brown County — Allouez, Ashwaubenon, Bellevue, Depere (town), Depere (village), Eaton, Glenmore, Green Bay (city), Holland, Howard, Humboldt, Lawrence, Morrison, New Denmark, Pittsfield, Preble, Rockland, Scott, Suamico, West Depere.

Buffalo County — Alma (town), Alma (village), Belvidere, Buffalo (town), Buffalo (city), Canton, Cross, Dover, Fountain City, Gilmanton, Glencoe, Lincoln, Maxville, Milton, Montana, Naples, Nelson, Waumandee.

Burnett County — Bashaw, Marshland, Trade Lake, Wood Lake.

Calumet County — Brillion, Brothertown, Charlestown, Chilton (city), Harrison, New Holstein, Rantoul, Stockbridge, Woodville.

Chippewa County — Anson, Auburn, Big Bend, Chippewa Falls, Eagle Point, Edson, Flambeau, La Fayette, Sigel, Wheaton.

Clark County — Beaver, Eaton, Fremont, Hewitt, Hixon, Lewis, Loyal, Mayville (including village of Dorchester), Mentor, Pine Valley, Sherman, Sherwood Forest, Thorp, Warner, Washburn, Weston, York.

Columbia County — Arlington, Caledonia, Columbus (city), Columbus (town), Courtland, Dekorra, Fort Winnebago, Kilbourn City, Leeds, Lewiston, Lodi, Lowville, Marcellon, Newport, Otsego, Pacific, Portage City, Randolph, Scott, Springvale, West Point, Wyocena.

Crawford County — Bridgeport, Clayton, Eastman, Freeman, Haney, Marietta, Prairie du Chien, Scott, Seneca, Utica, Wauzeka.

Dane County — Albion, Berry, Black Earth, Blooming Grove, Blue Mounds, Bristol, Christiana, Cottage Grove, Cross Plains, Dane, Deerfield, Dunkirk, Dunn, Fitchburg, Madison (city), Madison (town), Mazomanie, Medina, Montrose, Oregon, Perry, Pleasant Springs, Primrose, Roxbury, Rutland, Springdale, Stoughton, Sun Prairie (town), Vermont, Verona, Vienna, Westport, Windsor, York.

Dodge County — Ashippun, Beaver Dam (city), Beaver Dam

(town), Burnett, Calamus, Clyman, Elba, Emmett, Fox Lake, Herman, Hustisford, Juneau (village), Lebanon, Le Roy, Lomira, Lowell, Oak Grove, Portland, Randolph (village), Rubicon, Shields, Theresa, Waupun (city), Westford, Williamstown.

Door County — Bailey's Harbor, Brussels, Clay Banks, Egg Harbor, Forestville, Gardner, Gibraltar, Jacksonport, Liberty Grove, Sevastopol, Sturgeon Bay, Union, Washington.

Douglas County — Superior.

Dunn County — Colfax, Dunn, Eau Galle, Elk Mound, Grant, Hay River, Lucas, Menomonie, New Haven, Otter Creek, Peru, Red Cedar, Rock Creek, Sand Creek, Sheridan, Sherman, Spring Brook, Stanton, Tainter, Tiffany, Weston.

Eau Claire County — Augusta, Drammen, Fairchild, Lincoln, Ludington, Otter Creek, Pleasant Valley, Seymour, Union, Washington.

Fond du Lac County — Auburn, Ashford, Byron, Calumet, Eden, Eldorado, Empire, Fond du Lac (city), Fond du Lac (town), Forest, Friendship, Metomen, Osceola, Ripon (city), Ripon (town), Rosendale, Springvale, Taycheedah.

Grant County — Beetown, Bloomington, Boscobel, Cassville, Castle Rock, Clifton, Ellenboro, Fennimore, Glen Haven, Harrison, Hazel Green, Hickory Grove, Jamestown, Liberty, Lima, Little Grant, Marion, Millville, Mt. Ida, Muscoda, Paris, Patch Grove, Platteville (city), Smelzer, Waterloo, Woodman, Wyalusing.

Green County — Adams, Albany, Brooklyn, Cadiz, Clarno, Decatur, Exeter, Jefferson, Jordan, Monroe, Mt. Pleasant, New Glarus, Spring Grove, Sylvester, Washington, York.

Green Lake County — Berlin (city), Berlin (town), Brooklyn, Green Lake, Kingston, Mackford, Manchester, Marquette, Princeton, Ste. Marie, Seneca.

Iowa County — Clyde, Dodgeville, Eden, Highland, Mifflin (village), Mineral Point (town), Pulaski, Ridgeway, Waldwick, Wyoming.

Jackson County — Albion (including village of Black River Falls), Alma, Franklin, Hixton, Manchester, Melrose, Millston, Northfield, Springfield.

Jefferson County — Aztalan, Cold Spring, Farmington, Hebron, Ixonia, Jefferson, Koshkonong, Milford, Palmyra, Sullivan, Sumner, Waterloo (village), Watertown (city), Watertown (town).

Juneau County — Armenia, Clearfield, Fountain, Germantown, Kildare, Kingston, Lemonweir, Lindina, Lisbon, Lyndon, Mauston, Necedah, New Lisbon, Orange, Plymouth, Seven Mile Creek, Summit, Wonewoc.

Kenosha County — Brighton, Bristol, Kenosha, Paris, Pleasant Prairie, Randall, Salem, Somers, Wheatland.

Kewaunee County — Ahnapee (town), Carlton, Franklin, Kewaunee (town), Kewaunee (village), Lincoln, Pierce, Montpelier, Red River, West Kewaunee.

La Crosse County — Bangor, Barre, Burns, Campbell, Farmington, Greenfield, Hamilton, Holland, Onalaska, Shelby, Washington.

La Fayette County — Argyle, Belmont, Benton, Blanchard, Darlington, Elk Grove, Fayette, Gratiot, Kendall, Monticello, New Diggings, Seymour, Shullsburg, Wayne, White Oak Springs, Willow Springs, Wiota.

Langlade County — Carpenter, Langlade, Springbrook.

Lincoln County — Ackley, Corning, Jenny, Pine River, Rock Falls.

Manitowoc County — Cato, Centreville, Cooperstown, Eaton, Franklin, Gibson, Kossuth, Liberty, Manitowoc Rapids, Maple Grove, Meeme, Mishicott, Rockland, Schleswig, Two Creeks, Two Rivers (city), Two Rivers (town).

Marathon County — Bergen, Berlin, Brighton, Easton, Hamburg, Holden, Hull, Knowlton, Maine, Marathon, Mosinee, Rib Falls, Rietbrock, Spencer, Stettin, Texas, Wausau (city), Wausau (town), Weston, Wien.

Marquette County — Buffalo, Crystal Lake, Douglas, Harris, Mecan, Montello, Moundsville, Neshkoro, Oxford, Packwaukee, Westfield.

Milwaukee County — Franklin, Granville, Greenfield, Lake, Milwaukee (city), Milwaukee (town), Oak Creek, Wauwatosa.

Monroe County — Adrian, Angelo, Byron, Clifton, Glendale, Jefferson, La Fayette, La Grange, Leon, Lincoln, Little Falls, New

Lyme, Oakdale, Portland, Ridgeville, Sheldon, Sparta, Wellington, Wells, Wilton, Tomah (town), Tomah (village).

Marinette County — Peshtigo.

Oconto County — Little Suamico, Maple Valley, Oconto (city), Oconto (town), Pensaukee, Little River, Stiles.

Outagamie County — Appleton (city), Black Creek, Bovina, Buchanan, Centre, Cicero, Dale, Deer Creek, Ellington, Freedom, Grand Chute, Greenville, Liberty, Maine, Maple Creek, Osborn, Seymour (city), Seymour (town).

Ozaukee County — Belgium, Cedarburg, Fredonia, Grafton, Mequon, Port Washington, Saukville.

Pepin County — Durand (village), Frankfort, Lima, Pepin, Stockholm, Waterville, Waubeck.

Pierce County — Clifton, Diamond Bluff, Ellsworth, El Paso, Gilman, Hartland, Isabelle, Maiden Rock, Martell, Oak Grove, Prescott (city), River Falls, Rock Elm, Salem, Spring Lake, Trimbelle, Union.

Polk County — Alden, Apple River, Balsam Lake, Black Brook, Clam Falls, Clayton, Eureka, Farmington, Georgetown, Laketown, Lincoln, Lorraine, Luck, Milltown, Osceola, St. Croix Falls, Sterling, West Sweden.

Portage County — Alban, Almond, Amherst, Belmont, Eau Pleine, Grant, Hull, Newhope, Pine Grove, Plover, Sharon, Stevens Point (city), Stevens Point (town), Stockton.

Price County — Branon, Fifield, Worcester.

Racine County — Burlington, Caledonia, Dover, Mt. Pleasant, Norway, Racine, Raymond, Rochester, Waterford, Yorkville.

Richland County — Akan, Bloom, Buena Vista, Dayton, Eagle, Forest, Henrietta, Ithaca, Marshall, Orion, Richland, Richwood, Rockbridge, Westford, Willow.

Rock County — Avon, Beloit (city), Beloit (town), Bradford, Centre, Clinton, Evansville, Fulton, Harmony, Janesville (town), Johnstown, La Prairie, Lima, Magnolia, Milton, Newark, Plymouth, Porter, Rock, Spring Valley, Turtle, Union.

St. Croix County — Baldwin, Cady, Cylon, Eau Galle, Erin Prairie, Hammond, Hudson, New Richmond (town), Pleasant Valley, Star Prairie, Somerset, Springfield, Stanton, Troy, Warren.

Sauk County — Baraboo (village), Bear Creek, Dellona, Delton, Excelsior, Fairfield, Franklin, Freedom, Greenfield, Honey Creek, Ironton, La Valle, Merrimac, Prairie du Sac, Reedsburg, Sauk City, Spring Green (town), Spring Green (village), Sumpter, Troy, Washington, Westfield, Winfield.

Shawano County — Almon, Angelica, Belle Plain, Fairbanks, Grant, Green Valley, Hartland, Herman, Hutchins, Milltown, Lesser, Maple Grove, Navarino, Pella, Richmond, Seneca, Shawano (city), Washington, Waukeechon.

Sheboygan County — Greenbush, Herman, Holland, Lima, Lyndon, Mitchell, Mosel, Plymouth (city), Rhine, Sheboygan (city), Sheboygan (town), Sheboygan Falls (town), Sheboygan Falls (village), Sherman, Wilson.

Taylor County — Chelsea, Little Black, Medford, Westborough.

Trempealeau County — Albion, Caledonia, Dodge, Ettrick, Hale, Lincoln, Pigeon, Preston, Sumner, Trempealeau, Unity.

Vernon County — Bergen, Christiana, Clinton, Coon, Forest, Franklin, Genoa, Greenwood, Hamburg, Hillsboro, Jefferson, Kickapoo, Liberty, Stark, Sterling, Union, Webster, Wheatland, Whitestown.

Walworth County — Bloomfield, Darien, Delavan, East Troy, Elkhorn, Geneva, La Fayette, La Grange, Linn, Lyons, Richmond, Spring Prairie, Sugar Creek, Troy, Walworth, Whitewater.

Washington County — Addison, Barton, Erin, Farmington, Germantown, Hartford, Jackson, Kewaskum, Polk, Richfield, Schleisingerville, Trenton, Wayne, West Bend (town), West Bend (village).

Waukesha County — Brookfield, Eagle, Lisbon, Merton, Mukwanago, Muskego, New Berlin, Ottawa, Oconomowoc (city), Oconomowoc (town), Pewaukee, Summit, Vernon, Waukesha (town), Waukesha (village).

Waupaca County — Bear Creek, Caledonia, Dayton, Dupont, Farmington, Fremont, Helvetia, Iola, Larrabue, Lind, Matteson, Mukwa, Royalton, St. Lawrence, Union, Waupaca (town), Weyauwega.

Waushara County — Aurora, Coloma, Dakota, Deerfield, Han-

cock, Leon, Marion, Mt. Morris, Oasis, Plainfield, Poysippi, Richford, Rose, Saxville, Springwater, Warren, Wautoma.

Winnebago County — Algoma, Black Wolf, Clayton, Menasha (city), Menasha (town), Neenah (city), Neenah (town), Nekimi, Nepeuskun, Oshkosh (city), Oshkosh (town), Omro, Poygan, Rushford, Utica, Vinland, Winchester, Winneconne, Wolf River.

Wood County — Auburndale, Centralia (city), Grand Rapids (town), Lincoln, Marshfield, Port Edwards, Remington, Rock, Seneca, Sigel, Wood.

PREVENTABLE DISEASES.

In the following table are given the statistics of preventable diseases in Wisconsin, as shown by the returns received at the secretary's office, from the clerks of the local health boards above named:

TABLE I.

	Small Pox.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Measles.	Whooping Cough.
Number of towns reporting...	3	463	241	276	240	251
Number of cases reported....	9	7,031	2,778	1,362	3,954	4,135
Number of deaths reported ...	2	1,410	336	281	60	73

In the above table the numbers given are the aggregates from the actual figures reported from the several towns. In addition thereto we have to estimate as accurately as is possible the cases which have occurred in towns where the returns have indicated the prevalence of one, two or more of these diseases, but in indefinite terms; such language as "several, few, many, very many, some," and the like, being used, so that the reports could not be included in the above table. If, however, it be assumed that in the towns thus indefinitely reporting the number of cases of these diseases, and the mortality resulting from them, were equal to the average sickness and mortality from the same causes in the towns from *which definite* returns were made, an assumption that seems entirely

legitimate, we shall have, upon making the calculation and adding the results to the figures already given, the following table, as representing the amount of sickness and death during the year from the six specified diseases in 852 cities and towns of Wisconsin, the city of Milwaukee being omitted here for reasons to be presently mentioned:

TABLE II.

	Small Pox.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Measles.	Whooping Cough.
Whole No. of towns reporting	3	515	264	297	273	297
Probable No. of cases.....	9	7,811	3,043	1,467	4,499	4,894
Probable No. of deaths.....	2	1,566	368	303	68	86

In the city of Milwaukee, which has an efficient health department, monthly returns of mortality are made by the head of that department, which are probably close approximations to perfection. The figures drawn from these returns have thus far been omitted, 1st, for the purpose of placing in the strongest possible light the prevalence of certain forms of disease in the less densely populated portions of the state; and 2d, because in the monthly reports from Milwaukee deaths only find place, the number of cases ending in recovery not being given. Taking the available figures, however, assuming that the proportion of fatal cases to those ending favorably has been the same in Milwaukee as in other parts of the state, and adding the results of the calculation to the figures already given, we shall have the following table showing the amount of sickness and death during one year, in an area equal to about eight-ninths of the state, from diseases some of which sanitarians believe to be *entirely* preventable, and all of which are undoubtedly capable of being so greatly restricted that they will cease to be, as in the past they have been, the scourges of whole communities. The noticeable progress already made in this direction affords good encouragement for the continuance of sanitary labor.

TABLE III.

	Small Pox.	Diphtheria	Scarlet Fever.	Typhoid Fever.	Measles.	Whooping Cough.
Whole No. of towns reporting	8	516	265	298	274	298
Probable No. of cases.....	9	8,878	3,225	1,549	4,565	5,406
Probable No. of deaths.....	2	1,780	390	320	69	95

In connection with these tables the following facts, also collated from the reports made by the clerks of local health boards, are of interest: Of the whole number of towns reporting, one hundred and seventy-five have enjoyed entire freedom during the year from all of the maladies named in the tables; two hundred and twenty-four localities have been visited by some one of them; one hundred and eighty-nine places have suffered from the presence of two; in one hundred and fifty communities three have prevailed to a greater or less extent; seventy-one townships have been scourged by four and thirty others by five of them. No single place has been afflicted by the visitations of the whole six during the year. The very small number of cases of small-pox which have been reported, and which we have strong grounds for believing are all that have occurred in the state during the year, furnishes a subject on which the people of Wisconsin may well be congratulated. Careful inquiry into the origin of all cases of this disease showed that in every instance it had been imported from without, one case having been contracted in New Brunswick, another from a passing emigrant wagon, and a third during a railroad journey through Illinois. *In every case prompt isolation and strict quarantine prevented any spread of the disease* beyond the limits of the families in which it first appeared.

Diphtheria, however, a disease which by the same careful isolation of the patients, and the adoption of the means urgently recommended by this board and by many other state boards of health, may be very greatly restricted in its ravages, yet retains its bad

pre-eminence, the deaths reported from it numbering more than twice as many as those occasioned by the remaining five diseases taken together. By all the means at its command this board has endeavored to spread among the people of the state a knowledge of the eminently infectious and contagious character of diphtheria, and has persistently urged the adoption of the precautions which have again and again proven effective in its restriction. That these precautions have been adopted to some extent, and that the prudence of those adopting them has been fully vindicated by the results, the board has good reason for believing; the following extract from a letter received not long since at the secretary's office being one among many gratifying evidences of that fact: "There have been several cases of diphtheria in a public institution here, brought in from outside, but not a single additional person was affected. The means used to bring about this most desirable result were, *general cleanliness, a liberal use of disinfectants and* CAREFUL ISOLATION OF EVERY PATIENT."

This disease will, however, continue to invade our households and to carry off a cruelly unnecessary annual quota of victims until the people shall be convinced that it is capable of being controlled by isolation. A correspondent — not a medical man — says in speaking of this subject: "So hard is it to convince people that diphtheria is a contagious disease, that they will not only have public funerals in case of death from it, but will keep the bodies until all the relatives can be gathered together. Of course these carry the infection home with them, and in a short time some of them are stricken down; *their* friends and acquaintances are called in, in turn, and so the contagion spreads. Yet folks will not see what lies directly before their eyes, but say that the cause is in the air; if they are to have diphtheria they will have it anyhow, and if not they will escape: it makes no sort of difference, in their view, whether they go where the disease is or stay away! Not very long ago in a town near by, a girl died from diphtheria, and her body was kept, as usual, till all her friends could be assembled, and was then taken to another town, where no case of the malady had occurred for several years, and there buried with a large attendance

and a good deal of ceremony. The whole thing may do good in the end, for the people of the town in which the funeral took place are exasperated at being exposed to such a risk, and it is possible that something may be done to prevent a similar occurrence in future." Another report says: "Diphtheria has raged in one quarter of this town, but nothing was done, although the health board was properly notified of its existence. The people are very careless, moreover, going from house to house where it exists, taking no precautions whatever; some, indeed, claiming that precautions are of no use. So it goes; diphtheria spreads and people die!" And yet a third communication contains the following passage: "Diphtheria is raging with fatal effect near us, and will probably increase greatly during the fall and winter, as nearly or quite all of the funerals of those who die from it are public, and no precautions of any kind are taken against its spread."

Now it is entirely safe to say that whenever and wherever laxity such as that described in the extracts just quoted prevails, and is not only tolerated but justified by public sentiment, then and there will diphtheria hold high carnival; and that when the people learn, as it is earnestly hoped they will learn, that this is a highly contagious disease, capable of being spread from person to person and carried from place to place, and that when it is as carefully isolated as a case of small-pox is isolated at the present time, its progress may, and doubtless will be, greatly restricted, and multitudes of lives saved thereby.

The circular upon diphtheria, published by the board and printed in previous annual reports, continues to be in great demand, a new edition of ten thousand copies having been printed during the year. This circular has met with singular favor outside of Wisconsin, having been reprinted in several other states, and many thanks have been tendered to this board for the benefits derived from its teachings.

COST OF PREVENTABLE DISEASE.

In previous reports an attempt has been made to estimate the actual cost, in cash, to the community, of some portion of the disease which annually occurs in our own state. With this end in

view, requests have been appended to the blanks intended for the reports from local boards, asking for information as to the amounts expended for medical attendance and medicine, for any extra help rendered necessary by reason of the existence of sickness in a family, and for funeral expenses in case of death, together with an estimate of the average value of the time lost by the occurrence of sickness. Answers to these questions were received from between two hundred and three hundred places, and the average of all the various figures given has been taken as fairly representing the cost of a case of sickness anywhere within the state. Using the figures thus obtained as a basis (and it is to be remembered that they are drawn from the estimates of men who have at least more than average opportunities for judging with great accuracy), and upon the hypothesis that the cost of sickness and death is uniform all over the state, including the larger cities, we shall have the following sums to represent the actual money expenditure on account of six preventable diseases in Wisconsin during a single year:

Cost of cases ending favorably	$2,060,982
Cost of cases ending fatally	345,625
Total cost	$2,406,607

an amount which exceeds the sum expended in Wisconsin during the year ending August 31, 1879, for building and repairing school houses, school furniture, registers and records, apparatus and libraries, teachers' salaries, and all other purposes connected with the schools and educational institutions of the state, by more than a quarter of a million of dollars.

Nor is this by any means the whole cost. The absolute loss to the community of a large amount of productive labor during the time of sickness, and the further irreparable loss occasioned by death, must also be taken into the account. During the existence of slavery, the value at birth of a healthy child of either sex was reckoned in the southern states at one hundred dollars, and the value of an able-bodied field hand was at least one thousand dollars. Political economists, without exception, rate the value of free labor as being very much greater than that of slave or enforced

labor of any kind, other things being equal, and it must also be remembered that the value of a man to the community in which he lives rises in a very rapidly increasing ratio with any peculiar skill or knowledge of which he may be possessed. Therefore, the value of an ordinarily well educated freeman is at the lowest estimate double that of a totally ignorant slave; and the worth to the state of a man such as the late Prof. Carpenter, a victim of one of the diseases of this class, for instance, is beyond all computation. Placing the money loss to the state, however, at fifteen hundred dollars *per capita* for all who have died from the six diseases in the period of time represented by our tables, an estimate which is an exceedingly low one, we shall have a sum *very nearly approaching four millions*[1] as the absolute and irrecoverable loss to the state on this account during a single year. And if to this be added the further amount lost by reason of the withdrawal from active labor for a longer or shorter time of those who finally recovered — an amount not taken into consideration at all hitherto, — we shall probably have an aggregate loss of *not less than ten millions of dollars annually, to be charged to the account of one class of preventable diseases only, in the state of Wisconsin.*

Let it be granted that it is a low view to take of such matters — that it is even humiliating thus coolly to estimate in money the value of human life,— it is still true that "aggregate personal loss is the suffering of the community;" and we may therefore properly ask whether such considerations as the above are not worthy of careful thought by all classes of our citizens, and whether means are not well applied which have for their object the saving of a large part of this enormous tax on literally the vital resources of the state?

OTHER PREVALENT DISEASES.

Many of the reports for the past year, in addition to the diseases specifically inquired for, refer to the fact of an unusual prevalence of other maladies, among which consumption and pulmonary disorders generally are mentioned with considerable frequency. One

[1] Precisely $3,984,000.

hundred and fifty reports in all, make note of the prevalence of affections of the respiratory organs to an unusual extent; sixty-eight mention the occurrence of malarial disorders with uncommon frequency, and thirty-six speak of diarrhœa and dysentery as appearing with severity in their respective localities, while infantile diseases have attracted attention in a small number only of townships.

The large number of reports in which reference was made to consumption, etc., the brief notes which accompanied many of these, some expressing a fear that changing conditions of climate were operating to cause an increase, some simply calling attention to the number of cases, led to particular inquiry into the real state of things by means of the following circular to special correspondents:

OFFICE OF THE STATE BOARD OF HEALTH,
APPLETON, WIS., August 6, 1880.

DR. ——:

DEAR SIR — In asking you again for information in regard to the sanitary conditions prevalent in your neighborhood, the State Board of Health desires to renew its acknowledgments for the services hitherto rendered by its corps of special correspondents — services which have not only been of value to the board in the prosecution of its work, but have furnished information of interest and use to many into whose hands the reports of the board have fallen.

A very considerable number of the reports received from clerks of local health boards for the past year, speak of a marked increase in the number of cases of phthisis; others make mention of pneumonia and kindred diseases as having prevailed to an unusual extent, while still others report an increased number of malarial disorders of various types. Such accounts are well calculated to cause anxiety on the part of those who are watching the fluctuations of disease in our state, and, should they prove true, the changed or changing conditions of soil, climate, etc., which produce the increase of these maladies, cannot fail to have an important influence on the material welfare of the commonwealth.

The board, therefore, while desiring from its special correspondents a comprehensive report covering the general health conditions of their respective localities, made in such form as each one may prefer, will be glad to have answers as specific as possible to the following inquiries:

1. Has there been any special increase in phthisis, pulmonary diseases generally, or in diseases of malarial origin, in your own practice within the past year?

2. Have you any reason to think that cases of the above named diseases are increasing in number in your neighborhood to any marked extent?

3. If so, do you attribute the increase to any special cause, *e. g.*, to any change in the habits or modes of life of the people — to any increased influx of immigrants affected by such diseases, or to any changed conditions of the soil or climate? Has there been, during any considerable part of the year, any notable difference in atmospheric conditions or in the amount of soil moisture as compared with previous years?

4. Has there been any marked increase or decrease in the total amount of sickness in the territory under your observation as compared with previous years? If either, please give an approximate estimate of its proportions. Have the diseases which commonly prevail been either greater or less in amount or severity than in former years?

5. Has there been any increase or decrease in the number of zymotic or preventable disease? The history of any epidemic of such diseases is especially desired, with an account of the supposed origin or cause thereof, together with any facts showing the means of communication from one person or place to another, and any suggestions which you may have to offer for the prevention or restriction of such maladies.

The board desires information on the above or any other matters pertaining to the public health, not alone for its own information and guidance, but that it may use in its next annual report such extracts from communications as may be of general interest. No publication, whether of facts or names, will be made, however, should a desire be expressed that the information given may be regarded as confidential.

A stamped envelope is enclosed, which please use for your reply, leaving any excess of postage to be paid here. An early answer is solicited.

By order of the State Board of Health.

Very respectfully yours,

J. T. REEVE, M. D., *Secretary.*

Extracts from many of the communications received in response to the above circular are given elsewhere, as also a summary of the information contained in the remainder. One letter, however, from Dr. H. T. Godfrey, of Benton, is deserving of such special attention that we present it here. Going as it does to the root of the matter, it will help to remove the fear apparently entertained by some, that consumption is increasing among us by reason of any climatic or similar change of conditions, or that Wisconsin is becoming for any reason whatever a less healthy and desirable state for *permanent residence* than it has been hitherto. Dr. Godfrey writes:

"I think that cases of phthisis pulmonalis are decidedly more numerous than they formerly were amongst us. But this apparent increase of consumption must be attributed to a very great extent to the change in the character of the population rather than to any increase in unsanitary conditions. This country was settled about forty years ago by miners and others, drawn from the most robust of their class in England, Ireland, and the eastern portions of our own country. Only those in the highest physical vigor came here, prepared to rough it and to endure any and every privation in the pursuit of wealth; few, comparatively, made homes, and those attacked by sickness went away to recover or die, as the case might be. For the last twenty years or thereabouts, however, agriculture has become more and more of a leading industry; homes have been made and families founded; hence our population, instead of being composed of hardy pioneers solely, is now, like that of older settlements, a mixture of strong and weak, and we keep our sickness, consumption included, at home.

"But more than this, we have now reached a stage when we are sending out our younger and more vigorous men to the still newer states and territories, there to play the part of pioneers; these, if they become the subjects of disease, return home either to be nursed back to health or to have their eyes closed, and the last sad offices of affection performed by the hands most near and dear to them, and to swell the returns of death. All these facts and circumstances must be taken into consideration, and all go to render any estimate fallacious which depends on figures alone."

LOCAL BOARDS OF HEALTH.

It is a subject of regret that so few townships have seen the necessity for the establishment, by their own action, of local health boards which shall exercise jurisdiction over the sanitary surroundings of each independent municipality. "Our town is so healthy," it is frequently said, "that there is nothing whatever for a board of health to do," there being meanwhile, all over the same town, wells, privy-vaults and cess-pools in close proximity to each other, constantly making a free and friendly interchange of their

several contents; undrained back-yards, where typhoid germs are lurking, waiting their time and victims; school-houses and churches that seem to have been specially designed for the slow murder of their occupants; stables and barn-yards, poisoning the water of streams that otherwise would be pure and wholesome; perhaps here and there a slaughter-house, such as that described by a correspondent in this report, under which the soil is saturated with putrefying blood and offal; dwelling-houses ill-built, badly warmed, unventilated and undrained; all these alike being engaged in the work of lowering the vitality of the inhabitants, old and young, enfeebling them insensibly but surely, and rendering them easy victims when, by any chance, epidemic or endemic disease makes its appearance among them. It is probable that there are few, if any, towns in Wisconsin where the services of a skilled sanitary inspector would not be of value — a fact that some localities have already discovered, some, indeed, paying a high price for the knowledge in the shape of the lives of their citizens. In this connection two brief notes, attached to reports coming from the same town in two successive years, have significance: "1879. A board of health is needless; the town is too healthy to require any." "1880. A board of health has been found highly necessary to check the spread of diphtheria." And accompanying these were the following figures, representing the cases of disease in the town during the two years in question:

1879.		1880.	
Diphtheria	12 cases.	Diphtheria	45 cases.
Scarlet fever	6 "	Scarlet fever	21 "
Typhoid fever	13 "	Typhoid fever	30 "

Another note says: "We begin now to see the use of a board of health, whereas we formerly thought it a joke;" and there is ground for the hope that other communities are coming to see that it is far better to prevent epidemics than to cure them. A town will, with readiness and alacrity, pay almost any sum to rid itself of small-pox, diphtheria, or scarlet fever, or any kindred disease which may have fastened upon it, and proven not only a serious *interruption to business*, but a heavy tax upon human life, when

at a tithe of the final cost the epidemic might have been wholly prevented had proper steps been taken in the beginning, and had a properly organized board been in existence with the authority needed for taking those steps.

The reports of these boards, though made as the law requires by their clerks, have been in many cases the joint production of those officers and of

THE HEALTH OFFICERS

who hold their appointments from the local boards of health. Last year the whole number of such officers of whom this board had any knowledge was but 167, an increase of 37 over the number reported in 1878. The number this year is 207. Very few of these receive any fixed salary. All towns have a legal right to appoint a health officer, and it is matter for continuous regret that so few exercise that right. The difficulties attendant upon securing an officer competent to fill a position where the duties are onerous and often delicate, and where the responsibility is great, are fully appreciated; but it cannot be truthfully questioned that there are very many places in the state where such an officer could be employed with great benefit, and there are probably few localities where no one can be found competent to render service which would greatly benefit the community.

To the officers of this kind who have been appointed, many of whom have done excellent work gratuitously, this office tenders its thanks for valuable information. Some communications from them contained matter of such general interest that we have made extracts from them for publication; these are included with the extracts from the letters of

SPECIAL CORRESPONDENTS,

to whom also we again return very hearty thanks for the continued interest manifested by them in our work. Our list of names of these co-laborers now numbers seventy-four, including representatives in forty-three counties of the state, but, as has been said in previous reports, we desire to establish relations of this character in all parts of the state, and we cordially invite any who are

interested in the advancement of sanitary science to communicate with this office.

Among those who should be interested in the work of the board, especially in the very extensive field of household hygiene, are the women of the state, some of whom are taking a very active part in the farmers' clubs and agricultural societies, to the proceedings of which they have made interesting and valuable contributions. The board of health of Massachusetts, and, if we mistake not, those of some other eastern states, have been indebted to women for various papers on matters of home living, and we should be pleased to have the women of Wisconsin manifest their interest in our labors in the same way.

LIBRARY.

Since the date of the last report, the library of the board has received the following additions:

By Gift and Exchange of Publications — Biennial Report of the State Board of Health, California, '78 and '79, from F. W. Hatch, M. D., secretary; Transactions of the State Medical Society of New York, 1879, from W. M. Smith, M. D., secretary; Report of the Secretary of State, Wisconsin, 1879, Hon. H. B. Warner; Report of the State Superintendent, 1878, from Hon. W. C. Whitford; Transactions of the Medical Society of the State of Michigan, for 1879, from G. E. Ranney, M. D., secretary; Transactions of the Medical Society of the State of New Hampshire, for 1879, from M. W. Russell, M. D.. secretary; Seventh Annual Report of the Northern Hospital for the Insane, from W. Kempster, M. D., superintendent; Second Annual Report of the State Board of Health of Connecticut, from C. W. Chamberlain, M. D., secretary; Vol. 6, Transactions of the Northern Wisconsin Agricultural and Mechanical Convention, from R. D. Torrey, Esq., secretary; Third Annual Report of the State Board of Health of New Jersey, from E. M. Hunt, M. D., secretary; Second Annual Report of the Health Commissioner of the City of Milwaukee, from O. W. Wight, M. D., commissioner; Annual Reports of the Secretary of State of Minnesota, for 1877, 1878 and 1879, from J. K. Hoffmann, Esq.;

Secretary's Report.

Third Biennial Report of the Board of Health of the State of Maryland, from C. W. Chancellor, M. D., secretary; Wisconsin Blue Book for 1880, from Hon. J. B. Bennett, Wisconsin Senate; Report of a Special Committee on the Water Supply of the City of Cambridge, Mass., from W. S. Barbour, Esq., city engineer; Proceedings of the Conference of Charities for 1875, 1876, 1877, 1878 and 1879, from H. H. Giles, Esq., secretary of the conference; Ninth Annual Report of the State Board of Charities and Reform, from the secretary; Report of the Health Officer of the District of Columbia, from Smith Townshend, M. D., health officer; Twenty-sixth Report upon Births, Marriages and Deaths in the State of Rhode Island, 1878, from C. H. Fisher, M. D., state registrar; Summary of Births, Deaths, Marriages and Still-Births in New York City, as compared with other American and Foreign Cities, by John T. Nagle, M. D., from the author; Circular on Diphtheria, from the Minnesota State Board of Health, from the secretary; Sixth Annual Report of the Railroad Commissioner of Wisconsin, from Hon. A. J. Turner, commissioner; Sanitary Organization of Nations, by H. I. Bowditch, M. D., Boston, Mass., from the author; Report on the Condition of the Water Supply in the First Ward of the City of Racine, by J. G. Meachem, Jr., M. D., from the author; Seventh Annual Report of the Board of Health of the City of New Haven, Conn., from the board; Transactions of the Medical Society of the State of Connecticut, 1879, from C. W. Chamberlain, M. D., secretary; Report of the Board of Health of the State of Louisiana for 1879, from the board; Annual Report of the Board of Education of the City of Oshkosh, 1879–80, from G. H. Read, Esq., superintendent; Thirteenth Annual Report of the Board of Health of the City of Dayton, O., from the board; Annual Report of the Statistics of Mortality and Meteorology of the City of Oakland, Cal., for 1879, from J. B. Trembley, M. D., health officer; Lecture on the Education of Girls and Studies on the Laws of Life, by Nathan Allen, M. D., from the author; State Medicine and State Medical Societies, by S. Chaille, M. D., from the author; Second Annual Report of the State Board of Health of Rhode Island, from he board; First Annual Report of the Board of Health of the

Taxing District of Shelby County, Tenn. (City of Memphis); Report of the Board of Health of Hudson County, N. J., 1879, from the board; Reports of the Pennsylvania Training School for Feeble-Minded Children, for 1878–79, and Proceedings of the Association of Medical Officers of American Institutions for the Education of the Idiotic and Feeble-Minded, 1876, '77, '78 and '79, from I. N. Kerlin, M. D., Media, Pa.; Eleventh Annual Report of the State Board of Health of Massachusetts, from the secretary; First Annual Report of the Bureau of Statistics and Geology of the State of Indiana, 1879; Annual Report of the Board of Health of the City of Richmond, Va., 1879; First Annual Report of the Board of Health, Lunacy and Charities of the State of Massachusetts, 1880, from the secretary; Eighty-ninth Volume Transactions of the State Medical Society of Connecticut, 1880, from C. W. Chamberlain, M. D., secretary; Practical Hygiene as it Relates to a Proper Water Supply, by I. N. De Hart, M. D., from the author; Papers on Water Supply from the Supplement to the First Annual Report of the Massachusetts State Board of Health, etc., by Prof. W. Ripley Nichols, from the author; Medical and Surgical Directory of the State of Iowa, by C. H. Lathrop, M. D., from the author; Supplement to the First Annual Report of the Board of Health, Lunacy and Charity of the State of Massachusetts, embracing Papers on Public Health, from C. F. Folsom, M. D., secretary; Contamination of Drinking Water by Filtration of Organic Matter through the Soil, by V. C. Vaughan, M. D., from J. K. Allen, Esq., Lansing, Mich.; Thirteenth Annual Report of the Connecticut State Hospital for the Insane, from A. M. Shew, M. D.; A Glance at the Past and Present Condition of the Insane, by A. M. Shew, M. D., from the author; Enumeration, Classification and Causation of Idiocy, by I. N. Kerlin, M. D., Media, Pa., from the author; Transactions of the State Medical Society of Minnesota, from the secretary; Second Annual Report of the State Board of Health of Kentucky, from J. J. Speed, M. D., secretary; Proceedings of the Seventh Annual Conference of Charities and Correction, 1880, from A. O. Wright, Esq., secretary State Board of Charities and Reform; Yellow Fever in U. S. Ship Plymouth, from P. S. Wales, M. D.,

surgeon-general, U. S. N.; Manual of Laws Relating to Public Health, Model Sanitary Ordinances, References to Laws and Reports Published by the Board of Health of the State of New York, from E. Harris, M. D., secretary; Circulars Regarding Diphtheria and Scarlet Fever, with Rules for Local Health Boards, published by the Board of Health of the State of Iowa, from L. F. Andrews, M. D., secretary.

By Purchase — Plumber and Sanitary Engineer, vol. 3; Scientific Monthly, vols. 16, 17, 18; Transactions American Public Health Association, vol. 5; Richardson's Ministry of Health; Working Men's Homes; Frey's Microscopic Manipulation; Foster's Physiology; Johnson's Chemistry of Common Life; Wilson's Healthy Homes; Hale's Management of Children; Health Primers, 6 vols.; Bible Hygiene; Eveleth's School Houses; Wood's Medical Library, 1879 and 1880.

EXPENSES.

The vouchers which have been examined and have received your approval are numbered from 234 to 298, inclusive, and cover the following expenditures:

Official expenses of members	$662 01
Postage and box rent (including telegraphing)	308 44
Printing	234 74
Books and instruments	136 26
Secretary	1,800 00
Clerical services	300 00
Furniture	15 75
Transportation (freight, express, etc.)	85 77
	$3,542 97

THE PEOPLE AND THE WORK OF THE BOARD.

Among the more prominent and encouraging evidences received that the work of the board is reaching the people and meeting real wants, I may mention the facts that during the year requests for advice in reference to the location, construction, ventilation, etc., of school and other public buildings have been frequently made by school officers and others interested; that the advice of the board

has also been sought on many occasions in regard to other sanitary questions, and very frequently with reference to the proper measures to be pursued in the limitation of the spread of epidemic disease. Such requests have always received prompt attention, and advice has been given which it is hoped has been serviceable in the particular cases in which it has been asked, and helpful to the interests of general sanitation.

The services of the board have also been called into requisition by a committee of the legislature in the course of an investigation of one of the state institutions, in which the entire board took part, reporting its conclusions to the committee by whom its assistance was desired.

Throughout the entire year, as was the case during a portion of last year, Prof. T. W. Chittenden has been associated with me in the work of this office, and thanks are due to him for the efficient service he has rendered in the discharge of its varied duties.

Very respectfully,

J. T. REEVE, M. D.,
Secretary.

General Hygienic Knowledge a Necessity for the People.

GENERAL HYGIENIC KNOWLEDGE,

A NECESSITY FOR THE PEOPLE.

Early in the Christian era, Galen announced that the health of the body depended upon an equal and uniform mixture of solids and liquids, and its illness from their disproportion and inequality. He seems to have been the first to intelligently observe and crudely formulate correct ideas of pathology, therapeutics, the causes of disease and the laws governing health and longevity. After his death the doctrines of Hippocrates again obtained prevalence, until the most intelligent men of that time believed that "famine, death, foul air and epidemics were caused by evil spirits." As a result of this condition, the common people sought to ward off impending ills and cure bodily diseases in practices of magic and piety, having recourse to talismans and cabalistic signs to exorcise the evil spirits and obtain the assistance of the good spirits.

At the end of the fourth century, the temples of Æsculapius, Hygeia and Serapis were closed, and the church took more immediate charge of the afflicted.

During the fifth and sixth centuries there were advocates of a regular diet and care in the selection of aliments; of proper habits of life; of pure air; and crude ideas were formulating as to the effects of surroundings upon health and longevity.

In the seventh century the Koran contained in the form of aphorisms some excellent, and, for that time, remarkable principles with regard to physiology and hygiene; but it was not until near the close of the eighth century that there was any regular course of medical instruction, and this was under the direction of the

church, and controlled by monastic orders. At this time the intercession of saints, the touching of relics, and pilgrimages, were commonly resorted to, not only to cure but to prevent diseases. The reputation of the schools of Monte Casino and Salerno attracted the most able men of their generation as instructors, and they established a limited hygienic code which even now shows a good degree of common sense, the result of good powers of observation and extensive experience.

When what was termed the municipal regime arose upon the ruins of the empire of Charlemagne, the monks saw that their power was threatened by the laymen, and progress was thereby more rapid. Hospitals were founded, and during the eleventh century were rapidly increased by reason of the crusades. It was not until several terrible epidemics had occurred in Europe, in the fourteenth century, that any idea of an organized force was entertained. It was carried into execution by the appointment of a medical police for all countries, and under the joint supervision of church and state. "The well-known black plague, one of the greatest scourges that ever devastated the world, and which originated in the Asian marshes in 1348, ravaged Italy and France, spreading from thence to Germany, England and Holland. * * * Public sanitary measures do not date, however, from this period of general calamity, but from a somewhat later epoch, when the outbreak of various local epidemics caused great apprehension as to the return of the black plague. The closing of houses, streets, and even quarters where the disease had raged, the drawing of a sanitary cordon round the places infected, and, what was still more important, the scientific investigation of the causes of the disease, the cleansing of the sewers and the streets, the purifying of the drinking water, the transfer of the needy sick to some place outside the walls, and the practice of burying the victims of epidemic in quicklime, testify to the prudent precautions of the administration."

In the fifteenth century the populace sought in the occult sciences, especially astrology, a solution of all these vexed questions. "An epidemic was caused by the conjunction of different stars;

General Hygienic Knowledge a Necessity for the People.

and as the inherent principle of every illness was in the constellation beneath which the sufferer was born, the doctor's first duty was to seek out the constellation, so as to get a basis for his prognosis."

It was near the seventeenth century that the works of Hippocrates and Galen first saw the light by means of the art of printing. From this time on the priesthood rapidly lost control of scientific questions, and laymen more effectually took up the work. Their zeal in investigations, their private teachings, hospital instructions, and, more than all, the system of education in all the principal universities, all of which were in a great degree guided by the wise teachings of these philosophers, gave such an impetus to scientific investigations, that progress up to our present standpoint has been nearly if not quite co-equal with that of the arts. It will be noticed that early in the fourteenth century a police was created to regulate in a limited way the sanitary condition of all countries, and from that to the present time there has been an ever-present conviction that the public should be instructed in those things pertaining to health, comfort and longevity, and that it should be protected by organized bodies to give direction and force to all hygienic or sanitary laws for the public welfare. If life be worth anything, or if its duties require of us the greatest amount of mental and physical vigor, what can be a more profitable study than that of the attainment of a better mental and physical culture — a more vigorous ripe age, divested of many of our physical ills,— a study leading up to a more perfect manhood. Man was made in the image of his Creator — placed upon the earth and surrounded by all those things necessary to his comfort and happiness. That he carry out the purposes of his Creator in the proper and intelligent use of these things — that he recognize his relations to Him, to his brother man, and to society,— is a personal responsibility. To faithfully discharge this trust he should possess the largest amount of information attainable as to the laws and forces governing these relations, and apply them with strict fidelity.

That a general knowledge of hygiene is now felt to be a public necessity is shown by the organization of our National Public

General Hygienic Knowledge a Necessity for the People.

Health Association, the National Board of Health, State Boards of Health, and the various sanitary commissions and organizations springing up all over the land. The daily and weekly press has caught the spirit of the time, and is now lending its powerful aid in the direction of awakening a more general interest with the people, and is contributing much general information in the way of hygienic knowledge.

Hygiene is a broader field to explore than the first thought would suggest, perhaps. A good general definition is: "The art of preserving health; that is, of obtaining the most perfect action of body and mind during as long a period as is consistent with the laws of life. In other words, it aims at rendering growth more perfect, decay less rapid, life more vigorous, death more remote." In the largest sense it is the perfect culture of mind and body. We cannot dissociate the two. The intimate relations existing between them, and the condition of each so affecting the other, little progress can be made without harmony of action.

The individual may desire and strive to attain to the greatest perfection in hygienic conditions and surroundings, yet fail to do so by reason of the carelessness or ignorance of his neighbor. So a whole community may be placed under unfavorable hygienic conditions by the action of others. Pure water is necessary to health, yet a vault, cesspool, or slop drain not far away, may so contaminate the supply that disease and death result. Pure air is also a necessity, yet an individual cannot control the air he must take into his lungs. Other persons may poison his air, and thereby neutralize his best endeavors towards a better standard, and he be powerless to prevent it. General information and intelligent concerted action are necessary to proper conditions. The laws governing these are so many, and so subtle, that with the body politic constituted as it is, it is a matter of great doubt how near we may be able to reach the end we aim to accomplish. If favorable hygienic conditions were enforced, many would feel that personal rights were invaded, and the average American is very tender upon this subject. It may not be practicable to prevent the building and renting of tenements that are unfit for human beings to

General Hygienic Knowledge a Necessity for the People.

occupy, or in many other directions to force a better condition. We may hope to gradually change these relations by a more general knowledge of sanitary laws. The pressure of an intelligent public opinion has always been, and always will be, potent to correct in a great measure public evils, and while we may not reach that state of perfection desirable, we may hope to advance toward it.

In treating this subject one writer says: "In the scheme of Providence it may not be meant that man shall be healthy. Diseases of mind and of body may be the cross he has to bear; or it may be the evil against which he has to struggle, and whose shackles he is finally to unloose. The last disease will disappear, we may believe, only when man is perfect; and as in the presence of the Saviour all disease was healed, so before perfect virtue, sorrow and suffering shall fade away. Whether the world is ever to see such a consummation, no man can say; but as ages roll on, hope does in some measure grow. In the midst of all our weaknesses, and all our many errors, we are certainly gaining knowledge, and that knowledge tells us in no doubtful terms that the fate of man is in his own hands. It is undoubtedly true that we can, even now, literally choose between health or disease; not, perhaps, always individually, for the sins of our fathers may be visited upon us, or the customs of our life and the chains of our civilization and social customs may gall us, or even our fellow man may deny us health, or the knowledge which leads to health. But as a race man holds his own destiny, and can choose between good and evil; and as time unrolls the scheme of the world, it is not too much to hope that the choice will be for good."

The result of human efforts never attains to entire perfection, but the nearer we reach the desired end the greater the general good. Individuals, as such, cannot strictly follow rules of hygiene; but individuals make communities, and communities make nations, and nations can dictate the general rules leading up to an advanced civilization, and, therefore, to a greater degree of health, happiness and longevity. Inasmuch as the individual is powerless to prevent other persons from contaminating the air he must breathe, the

General Hygienic Knowledge a Necessity for the People.

water he must drink, or the food he must subsist upon, it is proper, and it becomes a duty, that national action be taken to control individual action. The lack of general information upon hygienic laws, from early civilization to the present century, has failed to produce effective organized action. Within a recent period of time, sanitary bodies, state medicine, etc., have contributed much in the way of health and information, and they seem to mark the beginning of a rapid, intelligent advancement.

The individual hardly realizes how great a place hygiene occupies in the several epochs of his life. Prof. Parkes divides it:

First. In relation to the natural conditions which surround him, and which are essential for life. Such as the air he breathes, the water he drinks; his food, the source of all bodily and mental acts; the soil which he moves on, and the sun which warms and lights him, etc.; in fact, in relation to nature at large.

Second. In his social and corporate relations, as a member of a community, with certain customs, trades, conditions of dwellings, clothing, etc., subjected to social and political influences, sexual relations, etc.

Third. In his capacity as an independent being, having within himself sources of action, in thoughts and feelings, desires, personal habits, all of which affect health and require self-regulation and control; and he then says, even now, incomplete as hygiene necessarily is, such a work would, if followed, almost change the face of the world.

The more one studies this subject the more he realizes its magnitude, and the great necessity for that amount of general knowledge with the public, which, if obtained, will surely eventuate in wise and effective measures looking to the decrease of suffering, and increase of happiness to the human race.

That we have advanced, both in mental and physical development, is proven by statistics and the history of the world, and the march is onward. If we turn to the history of the middle ages for evidences of advancement, we shall see the force of Prof. Bartholow's statement: "Pitiable, indeed, was the condition of the human race in those days of the world, when the conditions of health were

General Hygienic Knowledge a Necessity for the People.

either unknown or disregarded. There is no spectacle so sad and so terrible as the march of a great and fatal epidemic. That spectacle is even now rarely absent from the world, owing to the ignorance and cupidity of men; but the severest epidemics of the present century sink into insignificance when compared with the great epidemics of the middle ages. In the great Plague, for example, the vast numbers of the dead rendered the ordinary modes of interment impracticable. "The pope consecrated the Rhone, that the dead bodies might be disposed of without delay; and just outside the great cities, huge pits were dug, in which thousands of dead were thrown at a time. At Vienna there were six large pits containing many thousands; and in London it is narrated that one huge burying ground alone contained 50,000 corpses arranged in layers in huge pits."

If we follow this along, we find that these scourges permanently affected the development of the civilized nations. By the Black Death, Europe lost one-half its population, and in succeeding centuries cities, empires and armies were devastated by other epidemic diseases. One of the strongest proofs of the great benefit conferred, even with our present limited knowledge of hygienic laws, may be found in contrasting former centuries with the present one as to the ravages of Small-pox. A writer has said: "In Europe, as in other countries, Small-pox long constituted one of the greatest scourges of mankind. Not a decade passed in which the disease did not decimate the inhabitants in one country and another, or over great tracts of country, so that it came to be more dreaded than the plague." In a short time after it reached Mexico it destroyed three and a half millions, including the emperor. Even as late as the eighteenth century about one-twelfth of the deaths in Berlin, and one-tenth of those in England, were due to this disease. In France 30,000 died annually of this loathsome disease. The discovery of Jenner, with a better knowledge of hygiene, has so far destroyed its contagious power that it has but little terror for any people in the latter part of the nineteenth century.

As a further evidence of progress Dr. Bowditch says: "Intermittent fever has ceased in certain parts of Great Britain and in

General Hygienic Knowledge a Necessity for the People.

this country, under the influence of tillage and drainage of the soil. Private investigations in Europe and in America have in these latter days proved that a residence on a damp soil brings Consumption, and that drainage tends to lessen the ravages of that disease. Still more recently, cholera has been brought in its origin and progress under law, and we know how we could possibly prevent it if proper precautions against its origin were taken."

The census reports and other statistical information have demonstrated beyond a doubt, that, under a more perfect knowledge of the laws governing health, the average of human life has increased, and, contrary to the statements of crying philosophers, we know that the modern man is larger, stronger and more enduring in the various vocations of a busy life than his ancient prototype. And we also know, that, although still invaded by epidemics, the human race suffers much less than in former times. The world is comparatively free from those great pestilential waves, yet populations are denser, cities are larger, the older countries are becoming more and more overcrowded, and communication is more direct and rapid. Prof. Bartholow says: "The explanation is easy, and must be embarrassing to those pessimistic philosophers who find so much to condemn in our modern civilization. We owe our exemption from, or rather the diminution in severity of epidemics to the growth of our knowledge of disease and of the means of prevention. State or preventive medicine has risen into national importance. It would have been a great triumph if the bill creating a national health department, lately before congress, had become a law, for this would have placed us in advance of all other nations, except England, in a due recognition of state or preventive medicine. But our statesmen opposed it because of the bureaucratic dignity aimed at in the bill, and which could not be utilized as spoils. When epidemics are actually invading us, the machinery of a government bureau would be found very useful. It is a lamentable thing that our congressmen know so little of the matter as to fail to appreciate the importance of health to a nation, and of the pecuniary cost of epidemics."

Surgeon Billings, U. S. A., in a very able paper, says: "It is

General Hygienic Knowledge a Necessity for the People.

evident, therefore, that hygiene is not only a subject of scientific interest to the student or to medical men, but to the political economist and the legislator its problems and discoveries ought to be of great practical importance—greater, in fact, than many of the subjects with which those gentlemen usually occupy themselves; and at first sight it may seem strange that it should not receive more attention and consideration from politicians and legislative bodies than we actually find to be the case. A standing committee on public health would be about the last committee that either congress or a state legislature would think of organizing.

But when we examine the amount of knowledge as to the causes of disease which is actually possessed by the immense majority of fairly well educated and intelligent people, and see how much of it is mere vague conjecture, untested theory and baseless estimate, and, above all, how hopelessly unconscious they are of their own ignorance, and how promptly and confidently they will undertake to advise as to what should or should not be done to prevent Cholera or Yellow Fever, or any other disease whatever, we cannot wonder that the public at large is confused by the contradictory assertions made to it, and hesitates as to what should or what can be done in the matter.

There is a German proverb to the effect that "the better is often an enemy to the good," and this often applies to the action taken on propositions for improving the public health. The truly scientific sanitarian will promptly admit that his knowledge is scanty and defective; that he cannot assert that the measures he proposes are the best possible measures, but only that they are the best he can now devise; and that, in the present rapid progress in science and its application for the benefit of mankind, it may be that within a few years, at farthest, some better means may be found to produce the results desired; and these truthful admissions will often be used as arguments against his propositions and in favor of those of persons much more ignorant, but, by reason of that very ignorance, much more peremptory and assured in their assertions."

In a large degree our public necessity equals that of other nations; yet England is far in advance of us in the machinery necessary to a fair education of the public mind.

General Hygienic Knowledge a Necessity for the People.

In a lecture by Prof. Bartholow, he says, by way of contrast: "Far different has been the conduct of our English cousins. When that astute politician and wise ruler, Lord Beaconsfield, took office last, he signalized his entrance into power by making proclamation of the important place which health affairs should have in his administration, rightly recognizing the great influence which the national health and vigor has had in making England the very heart and centre of modern civilization. My Lord has been very busy in other weighty matters, and has not, therefore, paid the same attention he would have devoted to sanitary affairs; but they have not been neglected. England has an immense sanitary machinery — a medical officer of the Privy Council, a Registrar-General, a Health Board, and an officer of health for each sanitary district. * * * I am confident I do not exaggerate the importance of the subject, when I affirm that preventive or state medicine is the most necessary duty of a politician in this enlightened era. We are most lamentably behind the English, not only as respects governmental supervision and authority over all sanitary questions, but in the general knowledge of the subject possessed by the people."

If we turn from the humanitarian side of this subject, and view it from a merely mercenary or financial standpoint, we still confront the fact that hygienic knowledge is as necessary to the body politic as we find it to be from any other view. The eminent German scholar and philanthropist, Max Von Pettenkofer, said: "Mere chance will not explain the fact that, in the history of human civilization, it has always been unmistakably those nations that have shown the greatest care for the health of their citizens that have exercised the most useful and most powerful influence in the world." Rascher, in his celebrated work on the principles of national economy, states that the value of time is most fully appreciated among the civilized nations, as it is by the most intelligent individuals.

Passing by any consideration of the pain, suffering and sorrow caused by disease and death, and treating it only as a question of *local or national* economy, we find a large opportunity for amend*ment.*

General Hygienic Knowledge a Necessity for the People.

Munich, a city of 180,000 inhabitants, an acknowledged center of science, was for a long time practically without sanitary laws. It well illustrates the consequences of a disregard for the conditions upon which public health depends, as well as the benefits resulting from sanitary reformation. Something of an idea of the situation there may be formed from the summary of a writer who briefly states that tenements were built, solid fronts of them, over common cellars; and the various compartments of these cellars were occupied by dealers as storage-rooms for as many kinds of organic substances. One contained green vegetables, another milk, another wood, another was a butcher's stall, another was the rendering place of a tallow chandler, and so on. The pernicious effluvia from all these permeated the crowded tenements above. Burial places were in near proximity to the population and water supply, and leased on ten-year payments, the leases being renewed every seventy years. Bodies were laid, one above another, in the same grave, and at regular intervals the bones of all were removed to a common pit, to make room for new occupants. It was estimated that fifty tons of refuse matter was annually deposited in the grounds proper of the city alone, to send hither and thither among the inhabitants poisonous exudations without hindrance by means of well-constructed sewers or shade trees. It need not be told that the people of this beautiful city were sickly, and that, too, from their own voluntary disregard for sanitary regulations. Munich became known the world over as the home of Typhus. More than two thousand people there had Typhus fever every year. In 1873, the Cholera swept away its inhabitants like a devastating flood. More than fifty per cent. of those born there died in infancy, and the annual death rate of the whole population was four per cent. Is it any wonder that out of Munich there should spring a leader in the great sanitary reform that has spread over the enlightened countries of the globe; or that the people, brought to a full realization of the consequences of neglecting sanitary provisions, were ready to engage in carrying out plans for improvement? Sewers were constructed, refuse and garbage were transported to safe distances, water was supplied that had not percolated

burial places, and houses were modified to conform to hygienic principles. The result is, that now Munich ranks fairly among the healthy cities of the world. Her death rate has been reduced from four and two-tenths to three and three tenths, by which there is a saving of sixteen hundred lives annually; and by lessening the cost of sickness, the city saves more than two millions of dollars every year.

In a community of an average condition of health, and leaving out invalids, women and children, statistics prove that able-bodied men, between the ages of twenty and seventy years, will, on an average, lose seven days each year by sickness. If the average laboring man is sick seven days during the year, the loss as a producer will be at least fourteen dollars. In a community of ten thousand people, there should be about two thousand producers, and the loss would be twenty-eight thousand dollars. If we include the whole population, the average would be about twenty days to each individual, and the loss about one hundred and forty thousand dollars, and this exclusive of any estimate for necessary expenses incurred. With our present limited knowledge of the laws governing health and disease, it is estimated that at least one-half of this sickness may be prevented. If we carry our calculations on to cover the fifty millions of people in our own country, we will find that the loss assumes huge proportions; so large that it is well worth the attention of the political economist. The saving or increase of the productive capacity of the people, under a new order of things, would, even in one year, go a large way towards paying the expenses incurred in changing the essential things necessary to a better hygienic condition.

If we drop the sordid side of this question, and turn again to that which more particularly affects our hearths, homes and affections, there is found a greater incentive to a careful study and consideration of this subject. That we may do so intelligently, it is necessary to know, somewhat in detail, what we ought to learn, if we aim to reach a higher standard.

Dr. Fothergill, in a recent work on Maintenance of Health, has *submitted* a series of propositions that as nearly cover the ground

General Hygienic Knowledge a Necessity for the People.

in a popular way as any we have, and a portion of them are given below that we may better understand the necessity of more general information, and at the same time indicate more in detail some of the many things it is necessary to know.

For perfect health, or the nearest possible approach to it, not only is a sound body requisite, but a similar mental condition is indispensable. It is not sufficient that the body merely be kept in temperance, soberness and chastity, the mind must also be controlled and governed. Consuming passion and carking care affect the body, and mental anxiety stamps its impress upon the outward man. Inevitable burdens are borne with a sense of resignation which renders them tolerable, but when self-inflicted no such mitigating force is in action, and contrition and remorse bring but slight and uncertain relief. Cleanliness of mind is as important as cleanliness of body. The habits of thought are as subject to our choice as the fashion of our garments. Self-respect is incompatible with rags, and health is equally incompatible with moral beggary. The mind may be debauched while the frame is in its integrity, but ere long the effects will be apparent enough. The breaches of the moral laws are neither so apparent in themselves, nor in their consequences, as similar infringements of the physical laws; but this should not lead to the inference that the consequences do not follow, or can be evaded. Education increases the choice of occupations, and so exercises an influence over the health of man. Mere labor without thought tends to insanity; while exercise is essential to the health of those engaged in sedentary occupations. Fresh air and sobriety are important matters in relation to health, and position in life is not without its influence. Children who are chronically half-starved do not make healthy men and women. The diet suitable to one clime is inappropriate to another, and personal habits exercise a great effect on health. Genteel poverty leads to much ill health, while luxury, intemperance and indulgence produce bad results. All force is derived from food, especially from the respiratory foods, and the form of food consumed has an influence over the character of men and animals. Overwork is very destructive to the body,

General Hygienic Knowledge a Necessity for the People.

and when it is mental, not uncommonly overbalances the intellect. Overworked persons are apt to die from comparatively trivial diseases, because their resistive power or vital force is low.

The difference in the supply of oxygen is the probable reason that the agricultural population is usually hardier than people gathered in factories and workshops. The mental powers may be improved by persevering labor; but if this be excessive, deterioration results, which is very distinctly shown in the present race after riches. The plagues, and many of the epidemics of past times, were due to the insanitary arrangements of our ancestors. Sunlight and cheerful surroundings have an important bearing upon health. Pulmonary Consumption is associated with a damp subsoil, and its prevalence is affected by drainage. Rubbish foundations are fertile sources of disease, and drains, damp proof courses and dry areas are required for houses in damp situations. Porous, moisture-absorbing materials are unfitted for the construction of houses. The air supply of a house must be sufficient in order to secure the health of the inmates. Impurities of the air are often solid — fever poisons and vegetable odors consist of minute solid particles. Diminution of oxygen in the respired air, or excess of carbonic acid gas, are both deleterious. Poisonous emanations may arise from the earth, or be given off in manufactories, and by chemical agents used in certain crafts. In imperfect ventilation the normal proportion of the constituents of the atmosphere is disturbed; and to insure proper ventilation, not less than 1,200 cubic feet of air per head per hour are requisite for health, and yet more is required for the sick. The rate at which air passes through a room, or is renewed, is as important as the cubic feet of space allotted to each person; therefore the fires we use, and the different systems of ventilation in use, materially modify the situation.

Water becomes hard from the presence of lime, and bright and sparkling from the carbonic acid gas contained in it, and its quality is affected by the geological formations over which it flows, or from which it is derived. Water may be purified by boiling, distillation, subsidence and filtration; therefore family filters should be in every house. The purer water is the more powerfully it acts upon lead;

therefore leaden pipes and cisterns are very objectionable. The waste-pipe of cisterns should never communicate with the drain without a break to admit of the escape of sewer-gas. The apt maxim, "the rainfall to the river and the sewage to the soil," is as applicable now as ever, and the disposition of sewage has an important bearing upon health. The presence of water adds to the offensiveness of decomposing matter. Where practicable, the removal of sewage by water is the easiest, cheapest and quickest. The position of a water closet in or about a house is more important than is commonly credited, and sewers should be water-tight and ventilated to permit the sewage gas from escaping at the water closets. Sewage in rivers pollutes them, and is injurious to those persons who live further down the river and drink the water. The proper disposition of sewage is to use it for agricultural purposes. It does not exercise a prejudicial effect upon the grass, or upon the animals fed upon it, or upon the human beings who eat them; neither is parasitic disease endangered thereby. Many, probably most, diseases are due to contamination of water and air. Malarial fevers arise from decaying vegetable matter and stagnant water. Enteric or Typhoid Fever is the result of insanitary arrangements, common in wet and dry seasons, and may arise without Typhoid Fever poison being present, but its presence makes infection almost certain. Dysentery and Diarrhœa are produced in like manner. The eruptive fevers are produced by infectious particles in the air. Epidemic disease is always most serious among those whose vital force is undermined by insanitary surroundings. Decay or decomposition is a process of oxidation — of atomic activity, and the particles of decomposing matter may be invisible to the strongest microscope, but are evident to the smell. Antiseptics unite with matter in a state of atomic activity, and bring it into a static condition, when it is harmless. These facts being known, it is of the greatest importance that disinfectants be used in the sick room in all atonic, low, contagious or infectious forms of disease. Poisoning may result from the use of pigments in confectionery, colored soaps, wall paper, or artificial flowers, or by the food we use. Putrefying meat causes disease, and putrescent food not only causes

General Hygienic Knowledge a Necessity for the People.

it directly, but more frequently undermines the constitution. Parasitic diseases are communicated by imperfectly cooked meat, and especially the flesh of the pig, either fresh or cured.

In some general remarks Dr. Fothergill says: "Man, as an animal, is chemically an oxidizing agent, reducing again to primitive forms the principles built up by the vegetable world, and taken in by him, either directly as vegetables, or indirectly in the shape of the material of other animals. Without vegetable life animals could not exist, and never could have existed; side by side they grow and flourish, indispensable to each other's existence; the tree breaking up the exhaled carbonic acid of the animal, the carbon being stored up in its increasing mass, while the oxygen is returned again, free and uncombined, to the atmosphere for the respiratory needs of the animal world. Round and round go the elementary bodies in ceaseless change of form, nevertheless never more than they were at first and will be at the last; the atomic material of this planetary sphere being ever absolutely the same in amount. The material of the bodies of Saul and his sons when burnt by the men of Israel after their ignominious exposure at Bethshan, in consequence of their defeat on Mount Gilboa, are circulating amongst us still; it served others before them, and has formed part of thousands since. It is quite within the bounds of chemical possibility, that some of the atoms contained in the fated apple of Eve may have lain in the material of the apple which revealed to Newton the law of gravitation; and that atoms of the knife, long mouldered into dust, with which Abraham threatened the life of Isaac, may be circulating in the blood of the Bedouin, aiding in bringing the free oxygen of the desert air to the tissues of the Arab rover. Shakespeare said: "To what base uses we may return, Horatio! Why may not imagination trace the noble dust of Alexander till he find it stopping a bunghole."

Finally, man is under the dominion of immutable natural laws. Impulse, temptation and ignorance are the great causes of man's violation of these laws. To meet the constant changes incident to growth, maturity and decay, material is taken in, in the form of air, *food and drink*, which is constantly appropriated and assimilated,

and so nutrition and repair are conducted. Outside of these, mental and moral influences, and the law of hereditary entailment, personal habits, and various surroundings, go to make up the sum of hygienic conditions. General and special education are desirable for all, as cultivation alike affects mind and body; action of a part leads to greater development of it; disease tends to a less perfect condition, and there is every reason to believe that man's happiness, as well as health, will be increased by the growth of knowledge, and particularly so if acquired in the direction of the subject under consideration.

From the foregoing suggestions, some imperfect idea may be gathered of the necessity for a more extended public education touching the question of hygienic knowledge.

In America the common school system is being brought to such a degree of perfection, and has become so generally adopted, that we must depend upon this as the surest and most effective means to a practical and permanent public education. It is unfortunate that no writer or scholar has yet given us a text book upon the subject of hygiene fully adapted to common school use. Even the present imperfect knowledge of hygiene indicates that it must rapidly develop into a science that more nearly and universally affects the human race in its wealth and happiness than any other. Our public educators should insist that it be made a part of our system of common school education. That system is already crowded, and its subjects groan as they stagger under the burden inflicted. It would hardly be human to add to this. The question presents itself to the practical mind, would it not prove a great public benefit to make hygiene a part of this system, even to the exclusion of Greek and Latin conjugations, which may be useful as a means of mental discipline, and appropriate in a classical course, but are not necessary to the curriculum of an education for the practical duties of life that is contemplated by our system of common schools?

RECREATION AS A SANITARY AGENT.

BY REV. J. W. HAGEMAN, OF WAUSAU.

Man finds in outward nature disturbing elements, typical of kindred elements within himself; but in a perfect state he is assured that none of these shall exist; that storms and similar convulsions of nature, violent changes of temperature, regions cursed with sterility, swamps and malarious districts shall all be done away; and he has learned that this is to be finally accomplished by his agency; that he is slowly to reclaim the earth by a strict obedience to those sanitary laws that are written upon his own nature, and founded upon his relations to surrounding conditions. From physical sins committed by man come in many cases the influences that cause disease; and he who would successfully combat evil natural conditions must guard himself against such sins, whether they spring from ignorance or are committed against the light.

Healthfulness and holiness are correlatives; so are filth and sin. Water loaded with the filth absorbed in percolating through a foul soil, through grave yards, stable yards, cess-pools, outhouse vaults, unclean dooryards, food that is tainted, fruits green or past a fitting stage of ripeness, milk that has absorbed the poison of unclean dairies or of rooms where patients lie sick of fevers, unsunned and unaired living rooms and bed rooms, cellars undrained and uncleansed from year to year, with layer upon layer of decomposed and decomposing vegetable matter covering the floor, and barrels of unmentionable abominations stowed away in dark corners, sending out their pestiferous vapors to poison the air of the house, irregularities in eating, drinking and sleeping, lack of proper and wholesome exercise, neglect of cheerful and invigorating amusement,—the whole round of sins which spread sickness over the earth and

tend to the generation of a feeble and diseased posterity, these are the dragons that we have to fight with, these the enemies which we must overcome, before society can make any substantial progress toward perfection.

It must be acknowledged that the science of preventing disease, the art which will ultimately push a very large part of physical evil out of existence, save the time both of patients and nurses and the money paid for medicines and the services of physicians, and spare the suffering from pain and the inconvenience resulting from sickness to the sound members of the household, this precious knowledge is as yet only in its infancy and is far from receiving the attention which that tender stage of existence demands. It is even to be feared that it is being purposely neglected. Our American method of living is to work under the highest possible pressure and take the chances of utterly breaking down. We are willing to spend almost any amount in curing disease, but, ignoring wholly the conditions under which disease inevitably originates, the means by which it is developed and spread broadcast through a community, we are very loth to be at even the smallest expense or go to any trouble for the purpose of preventing it. We need less hurry and whirl, and more true progress. We find that by far the larger part of the inmates of our insane asylums come from those classes who plod on from year to year, ignoring the laws of the body and denying the demands of the mind for rest, change, recreation. These think that a few hours sleep at night is all-sufficient as a restorative for the body, jaded and worn out by years of monotonous toil; and when at last the truth becomes too plain to escape even their perceptions, they resort to excitants, spur up their flagging energies of muscle, by stimulants and narcotics to act upon the nerves, and with the aid of these poor crutches they limp and stagger along for yet awhile longer, and at last break down and die miserably. Our physical stamina is weakening under the vicious system of forcing work by the aid of stimulants and soothing agents, and its effects through heredity. The laws of sanitary science demand that man shall so order himself in relation to his health conditions as to secure for the benefit of society, as well

Recreation as a Sanitary Agent.

as of himself, a sound mind in a healthy body; and one of the most agreeable, as well as one of the most necessary agents in doing this, is found in recreation; the true meaning of which is, that which re-creates. It is based upon a recognition of the law of the decay of the chemical compounds which, in unstable adjustment, form the body, the removal of useless or worn-out cells and atoms, and the repairing of the waste. The life-processes are beyond our control; and all that we can do is to make clear the way for the funerals of the dead particles and place new material within the reach of the little life-weavers within us, to be spun out by them and converted into brain, bone and brawn. We can, and we must if we would attain anything like physical perfection, so dispose of ourselves, so arrange our time, as to give them chance and opportunity to repair the waste, build up again the broken-down tissues. Though they work fast, we can tear down faster than they can build up, and they must have fair play and must not be over-hurried if they are to build well and strongly; if this be denied them, the result will be a broken-down constitution for the man or woman who treats them thus unjustly. Recreation, then, may be defined as the art of so disposing one's self that the whole organism, body and mind alike, may be kept strong and in perfect working order, and that all the resources of the individual may be completely under control, always ready for prompt and efficient service, able to respond to extra calls should it be necessary.

The economy of nature and society gives us three recreating agencies: sleep, which affords an opportunity for the upbuilding of the muscular and nervous tissues; the rest of the Sabbath, which allows space for the taking up of any loose ends, for the more complete finishing of whatever was left undone during the nightly rest of the week, and which brings into activity and aids to develop those forces of human life which find but little opportunity for exercise during the hurry and bustle of the business of the remaining days of the week; and the instinct of play, which involves change complete and entire, and the loosening of all strain. These three are the means of re-creation for the human organism; and, properly employed each in its due season, these will prevent much

of physical and mental disease. These are the means of recreation for the worker; to him who wastes his powers by not using them, who is toned up by no praiseworthy and noble ambition, it would be a true recreation to gain a definite aim in life, an object that shall compel him to use all his latent energies.

To the young men who dawdle through the streets and avenues of some of our cities, it would be recreation to exchange the cane for the surveyor's rod, the lazy, careless stroll through the city thoroughfares for the purposeful tramp through the woods and over the hills in making the highways over which commerce and civilization shall presently pass. And many a young woman who lounges in the parlor and trifles with her "accomplishments," would find true recreation and learn the repose of living for a purpose while studying the lines of beauty, in cutting and fitting garments for some needy child, in the modeling of a well proportioned loaf, in investigating the laws of chemistry as applied to cooking, in the selection of food suitable to different constitutions and the varying temperature of the seasons, or in the applications of hygienic laws to home life. The idler, the pleasure-seeker, he who finds every surrounding a bore, must find recreation in pursuits which will not pall, which will stir up the dull brain, and give the satisfaction and pleasure always attendant upon useful employment; such, in a word, must find recreation in ways diametrically opposite to those which will give rest and refreshment to people whose brain and muscular tissues are constantly worn out by hard work.

The more commonly recognized sphere of recreation is for the overworked and for those who need a relief from wearing occupations. Whatever its form it must be something which shall be congenial to the individual, and which demands but little strain and waste — at least in the same direction with our ordinary everyday pursuits. It should be such as will bring body and mind alike up to a good working pitch, strengthen both, and increase instead of diminish their resources. If the usual business of the individual be of a character to wear out the muscles, his recreation should be such as will allow of their renewal; if the nervous system be that most drawn upon, sleep may be the best form of recreation. The

paths which have been worn and worn out by repeated traversing must be exchanged for new ones; the old ruts and grooves must be abandoned for the time at least, and fresh channels must be formed. And yet care must be taken lest the change be so great as to work harm rather than benefit; it should be sufficient to turn the thoughts away from the wearing cares, but not so radical as to cause anxiety and worry. Too complete an alteration may be as bad as, or even worse, than none at all.

It is no true recreation to exchange a clean bed, a well ventilated and airy bed-room and good sanitary surroundings for a dirty couch, with feather-beds over and under one, in a filthy hut; nor, as the writer can testify, is it entirely a recreative process for one leading the ordinary daily life of a student to pole a heavy and clumsy log canoe up a rapid stream, to lift it by main strength over dams, and, at the end of a day spent in these pleasing labors, to have sleep broken, or rather wholly prevented, by clouds of hungry mosquitoes, or to waken feeling chilled, and find that one has been lying in a puddle, caused by a shower, through which he has slept from sheer exhaustion.

Had a tent, pitched upon the high bank of some swiftly-running forest stream, been substituted for the pioneer's cabin, with a bed of hemlock boughs and pine needles instead of feathers in the one case, or had the pleasant and congenial party in the other floated leisurely down some beautiful river in a roomy skiff, instead of the cramped and cramping dug-out, enjoying the scenery, admiring the wonderful rock-sculpture accomplished by the waters and the winds through the course of the centuries, and camping at night at whatever time and place seemed desirable or offered any special inducement to linger, and bringing their excursion to an end as soon as the first charm of novelty had gone, and before the necessary labors became distasteful, they would have reaped a benefit which was lost to a great extent in the fatigue and broken rest which were the concomitants of their actual journey.

Seasons, places, conditions should be studied in taking recreation, and regard should be had, moreover, to one's temperament, *usual profession*, the state of one's health and the degree of strength

of which one is possessed. With attention to these there can be no doubt of the benefits that will accrue, the recuperation both of body and mind that will be the result of proper recreation. Physical forces have a limit; the bodily tissues can endure only up to a certain point, beyond which even the lifting of a feather or thinking the lightest thought that can stir the brain-cells may be too much.

Weaken the nervous system by whatsoever means we may, whether by over-work or over-worship, whether by asceticism or prodigality in pursuing virtue or vice, following wisdom or folly, it matters not how, and we become nuisances to ourselves and to others. Then, as the dyspeptic is conscious of his stomach, do we become aware that we have a nervous system; thought is dulled and ideas are cloudy; sympathy awakens no gratitude, draws no response but querulous groanings. Children are banished with the petulant command "Don't bother me!" Too often in this miserable state the first gap is formed between the heart of the child and its mother; the thin edge of the wedge is introduced which is finally to force them apart forever, to render any confidence between them an impossible thing. It is within the experience of only too many how shattered nerves ruin home-life, disturb the peace of the family and put happiness far away. The writer knows of fellow students who, in their desire for excellence and knowledge, would pore over their books, neglecting proper exercise, failing even to take the sleep that was actually necessary, and, as might readily have been foreseen, broke down early and died or became insane. Because we can stand hard work we are apt to forget that there is a limit of resistance in every case, and to ignore the causes which inevitably produce their effects without regard to persons.

We know that hard work must be done in order to achieve success, and that the greatest names of history represent the hardest toil. Virgil spending twelve years on his Æneid, Thucydides twenty years on his history, Lucretius a life-time on his great poem; these are illustrations of the law of labor in relation to success. But in our modern life of elbowing and pushing to get bread, thousands seem to be rushing tired through life, to die wearied out

for the lack of recreation. Should they take time for it, they say that the many waiting for a chance would rush in and fill their places so that they would be crowded out and lost. This seems like committing slow suicide to keep off death. All workers need recreation for each day, each week, each year. Too often the alleged lack of opportunity is really only fear of Mrs. Grundy, who says that play is undignified and unbecoming for men and women. So much afraid are we seemingly of her sneer, her pointing finger, shrugging shoulder and sarcastic tongue, that we prefer to do almost anything rather than encounter them; hence we choose physic in place of exercise — poisonous drugs instead of health-giving sports. Mrs. Grundy has amusements of her own, it is true, but they are too often wearing, not recuperating.

But we are at last recognizing that the play element is a desirable, even a necessary feature of healthful social life, and are beginning to make room for it to some extent by admitting holidays into our calendar, as older and, in some respects, wiser nations have done before us.

In choosing a recreation after the toil and labor of the day are over, regard should be had to the character of that labor; the brain worker should engage in some pastime that will exercise his muscular system, and this should not be carried so far as to bring on overfatigue and nervous exhaustion, but should be sufficient to give sound sleep, and brace up the whole man for the work of the morrow. Such a toiler should go out into the sunshine when practicable and inhale the out-door oxygen in all kinds of weather. A walk, a gallop on horseback, a rush on the bicycle, a row on lake or river, a tramp with his gun through the woods, sparring, fencing, archery, some one or more of all these is within the reach of every man, and all of them, if not carried to excess or abused, will constitute recreation which will rebuild the worn down tissues. For those who are less vigorous, a stroll, a drive, a sail or game of croquet is available. All exercises however which aim at competition tend to cause over-exhaustion and over-excitement and are barred out by the very design of recreation. Big muscles are often *gained at* the expense of the constitutional powers, as are closely

packed minds at the price of losing all true and symmetrical development.

There is scarcely one among the many great and good men who are the objects of the world's admiration, and with whose names the words amusement and relaxation seem almost incongruous, who has not had some special favorite method of recreation. Bryant with his dumb bells, Gladstone swinging his axe, Bancroft riding through the avenues of Washington, Walter Scott with his dogs, Walton, Herbert, Bright and Paley with their fishing rods, Bushnell, Shelley, Goldsmith and Macaulay romping with children, Innocent III. playing ninepins, Addison, Bacon, Buffon and Cowley walking, Milton at the organ, and many more might be named as types of these.

For winter sports there are skating, ice boating, snow balling and the like, and if one wishes for more exciting and exhilarating sport, let him try the "toboggin;" as he scuds down the hill upon it he will make acquaintance with all its inequalities in far more intimate fashion than upon any sled with runners, although that may afford recreation well worth having. Any dignity that may be lost in these occupations can well be spared; it is not of the genuine kind and not worth having.

Besides the daily release from ordinary work which may not be sufficient in the aggregate to re-create thoroughly, and in all respects we have, by a law necessary for the well-being of society, one seventh of the week set apart in which we are forbidden to labor or cause others to labor for us. The capitalist should be made to understand that this time belongs absolutely to the workman, and that he is robbing his employes when he induces or compels them to labor during these recurring periods of rest. It is directly in opposition to the design of this day of recreation for those whom it is intended to benefit to employ it in excursions upon crowded cars and steamers, and in practices that weary instead of resting. Sanitary science here demands that those parts of the brain which during the remainder of the week lie disused shall be brought into exercise that they may not become paralyzed and lethargic, and at last die from pure inanition. On this day of recreation he should

strive to bring himself into harmony with his highest temporal and eternal environments, that the resulting peace and happiness may secure the best reaction of mind upon body. Physicians know how some secret care, some gnawing anxiety, preying upon the mind of a patient, will baffle the skill of any other than the Great Physician.

But besides the daily and weekly periods of rest, men need once in each year for perfect recreation an entire change of air, of scene and surroundings, of habits and modes of life. They should have a season during which all cares of home and business can be thrown aside; the office, the shop, the books and the tools become as completely ignored and cast away as though they were annihilated. An excellent means of doing this is to make a tour on horseback, taking care of one's own horse on the way.

Tramping over mountain regions (not tramping in the ordinary acceptation of that term, of some results whereof the writer has has some small experience), canoeing, yachting, hunting, fishing, geologizing, botanizing and similar excursions, more or less prolonged, offer many avenues of recreation. If one be in feeble or delicate health it will be wise, before starting out, to consult the family physician, and to be guided by his advice in selecting a mode of recreation. As a general rule, a purpose should be assigned as the object of every tour of recreation, which purpose should not be such as will centre the attention on one's self, unless the previous ordinary occupation has been such as to cause self acquaintance and self-development to be neglected, and then the best results will be attained by having such a purpose as will draw self out and set it in a light where one may see it as it really is.

Camping out is among the best and most agreeable of recreative agents. For this purpose places free from malarious influences should be selected; those living among the forests and mountains should, if practicable, go to the sea-shore; those who are enervated by the heat should seek cool localities. The tired and worn should avoid the excitements and restraints of fashionable life at popular resorts, as, also, on the other hand, should they beware of the wearying effects of solitude without congenial company. Our *evolution* from the earliest stages of civilization up to our present

standing has not destroyed all the instincts of savage life, and a partial return thereto at times, and for a brief period, has a decidedly beneficial effect. It is a good thing to cook our own food, to wear old clothes and the minimum of them, to dwell in tents, to hunt and fish, to yell and shout, to yawn, stretch and lounge as the fancy seizes us.

In camping-out, take your time, do not hurry, do not fuss, take everything as it comes and laugh at disagreeable accidents should they happen; have companions who are limber enough to be jolly, take along with you a supply of good novels for a rainy day, should one occur, and a handful of nonsense, wear woolen underclothing at night, and don't forget plenty of blankets. Use water from a spring or lake; should you depend on a running stream for a supply, explore it far enough to satisfy yourself that its waters are not polluted by any dead and decaying matter. Choose high and somewhat sloping ground on which to pitch your tents, and, whether you propose making your stay long or short, take time enough to render your temporary habitation safe and comfortable. The writer's experience has been, that, with an abundance of heavy flannels and blankets, camping-out, even in winter with the thermometer below zero, may be a preventive of disease and a valuable means of recuperation.

For those who cannot take such trips, recreation may be found nearer home. Even a change of the ordinary habits and ways of life may sometimes be a true recreation, by giving a chance for rest and thus preventing a degree of fatigue which renders the system more liable to the attacks of disease. For many an over-worked woman, in more remote farm-houses especially, it would be a recreation to be relieved from the necessity of cooking a hearty meal three times a day — particularly in the heat of summer; could the cooking for the whole day be done, occasionally at least, in the cool of the early morning, and the need of standing over a hot stove at noon-day be thus obviated, would not many wives be glad of the relief? And, if by this change there could be brought about some improvement upon the diet only too often found upon the farmer's table of salt-pork fried to a crisp, " fried cakes " and

the whole list of kindred abominations, would not the benefits extend far beyond "the women folks?"

A form of sanitary recreation to which some attention has lately been called, more especially in the Eastern States, is well worthy of imitation elsewhere. Those having farms and pleasant country homes have taken neglected children and broken-down workers in the great cities out into the country for a season, thus giving them the benefit of pure air, wholesome food and thorough change.

Fortunately the Creator has so firmly and deeply implanted the instinct of play in the nature of children, that the large majority of them do obtain a fair measure of health-giving recreation, and as they will in their plays imitate the employments in which they see their elders engaged, it is all-important that they should have the advantage of correct principles. So from mere matters of pastime and amusement, while breathing in pure air and getting the benefit of muscular exercise, they may gain much that will be useful to them in after life. In many of their games they might master to a great extent the philosophy which underlies much of the serious business of the world, and by so doing, diminish greatly the necessity for the high pressure under which education is at present too often conducted. Children need recreation of a different kind from adults. The interests of some pursuits and the novelty of change bring into play a certain kind of unconscious exertion, muscular or mental, which has a very different effect from that of forced labor.

To sum up all that we have to say, recreation is a necessity for all, for young and old, men and women, robust and feeble, ignorant and learned. To produce its full and its best effects recreation must however be suited to the individual. A week or two of camp life, which would be a novelty and a relief to the over-worked professional man, would be of little or no service to the lumberman whose associations with the woods are those of hard work. By properly selecting the methods of recreation, the nervous system is built up and invigorated, the digestive powers are strengthened, and the lungs being supplied with purer air, the blood *is more* thoroughly oxygenated and carries more vigorous life to

all portions of the system. Let us then have it at proper times and in full measure. In the name of health and happiness, because of the resulting vigor of body and cheerfulness of disposition, because recreation in itself is a powerful sanitary agent, preventing many disorders of both body and mind, because soundness of body is on the direct road to holiness and purity, we plead for more recreation of all true and genuine kinds, for more laughter and less frivolity, for more joyous romping with the children, for more living near to nature, among the mountains, in the woods, by the lakes, rivers and sea-shore, for more frequent Sabbaths of rest and worship.

Let our strained and straining American lives hear and obey the voice saying "Come ye apart and rest," and let us recognize through the benefits of obedience and recreation that it is really and truly the voice of God in man, the voice of Him who calls to all the weary and the heavy laden, saying "Come unto me and I will give you REST.

SCHOOL HYGIENE,

AND WHAT THE TEACHER CAN DO TO PROMOTE IT.

BY PROF. THOS. W. CHITTENDEN, OF APPLETON.

In former papers we have endeavored to sketch some of the requirements of an ideal school-house, so far as the health of its inmates is concerned, and have considered the defects only too often to be found in our school buildings as they exist to-day. In the present article we propose to discuss the means of counteracting in a measure some of these defects, i. e., the means which lie within reach of the teacher, some of the duties of the teacher in regard to the health of his pupils, whatever may be e character of the building under his control, some of the errors into which teachers occasionally fall in the management of the children committed to their care, and some of the injurious physical consequences resulting therefrom.

It is probably true that scarcely a single school-house exists in Wisconsin which is anything better than an approximation, more or less remote, to the perfect ideal of the advanced sanitarian, and Wisconsin is by no means the only state of the Union of which this may be said; nor is there probably a school-house where injury to a greater or less extent does not accrue to the health of its occupants; it is also true that the sum of this injury, which might be greatly lessened is, in some cases at least, greatly increased by the injudicious rules adopted for the government of the whole, or the unwise course pursued by the teacher in the case of individual pupils. We grant at once and willingly that no teacher whom we have ever known would do aught knowingly that could occasion *permanent* or temporary harm to a child, that in all cases where

harm is done it is done ignorantly; but we know that injury is too often caused during school life; we have sad suspicions that we ourselves have been the source thereof, verily thinking the while that we were doing good work and rendering good service, and we know that unconsciousness of the fact that harm has been done does not make that harm any the less real or prevent in any way its evil consequences.

Among the injudicious proceeding of the school room is the practice — not now perhaps as frequent as it was in former years, but still too often seen — of requiring the maintenance by a class or by all the occupants of a school room of a certain uniform position during comparatively prolonged periods of time. We do not allude to the barbarities of this kind sometimes even now practiced by way of punishment, but to measures of so-called discipline and training. For example, we have seen a large class of growing boys, some strong and vigorous, others the reverse, required to maintain "a military attitude" during an exercise sometimes extending through two hours' time, and never completed in less than one hour, which was called a review, in which the progress and conduct of each individual during the preceding week or term was made the subject of public discussion and comment. "My object is to harden them," said one who pursued this injudicious course, the cost at which such "hardening" was accomplished being wholly ignored.

Again we have seen instructors who require their pupils to stand erect and motionless during the whole time of a recitation, with books accurately inclined at a given angle, every disengaged hand so held that the index finger thereof shall point to a specified line upon the floor, and with every great toe aligned upon a certain crack, such stiff and wooden position to be maintained without variation until the close of the lesson, and great is the pride of the teacher and the admiration of superficial observers when a class is brought to so "high a state of discipline." Such instructors might profitably read some standard work on military drill, and thereafter take lessons from a skillful drill sergeant in his management of a squad of recruits. They would find in the treatise that even in the way in which a man stands allowance must be made for indi-

vidual peculiarities of build and conformation, and that, as no two men are cast in exactly similar moulds, so no two can take exactly similar positions in all respects; going into the drill-yard, they would observe the sergeant careful constantly to vary his exercises, in order to avoid weariness, and would also remark the frequency with which the recruits are allowed to rest. A very sensible writer has said upon this point: "When children are forced to remain standing, and to keep, as best they may, a fixed position for any length of time, they are sure to yield to some distorted action which soon becomes habitual, and not only destroys all grace of carriage but injures health as well. Strive as they may, even under the fear of punishment, there is not a limb which will not make good its natural claim to liberty by one motion or another. Set attitudes, if maintained for any length of time, are sure to degenerate into awkward habits if not into actual permanent deformity. No amount of training can ever give back to a child who has long been deprived of freedom of muscular movement the unconscious ease and grace seen in one who has always enjoyed such liberty." So far from being compelled to remain in one unvarying position for any considerable length of time, growing youth and children should be encouraged — even required to change the bodily posture as often as there is any sense of weariness or fatigue.

Whatever little justification for the practice of compelling a standing position during the whole of a recitation, may be found in the case of boys, there can be none at all where girls are concerned, and this is especially true in the case of girls of fourteen years of age and upwards. Strange as it may appear, we have observed, and our observations have been confirmed by that of others, that female teachers are often worse offenders in this respect than are those of the other sex. It would seem that having the benefit of their own experience, the knowledge of their own physical needs that they must necessarily have acquired, they would act more kindly and more wisely as regards pupils of their own sex at least. But we have visited school rooms where, with comfortable recitation seats provided, classes composed in very large proportion of

girls from fifteen to eighteen years old, were obliged to remain standing during a prolonged examination, and this in one instance in which a lady was in charge whose health had suffered greatly from precisely this cause!

But it is not only during recitations that the error of requiring this wooden fixedness of position is committed; it is true that we do not now often see the school-room in what was commonly supposed to be the "perfect order" of our own younger days, but there are yet teachers who forget or have not yet learned that true order and solid advancement in knowledge are quite consistent with easy and unconstrained positions of body, and that the fact that every hand is carefully tucked away out of sight and every eye riveted on the book is no guarantee that the thoughts are not wandering; that the child in imagination is not far away. Teachers of writing are perhaps especially prone to insist upon an exact and rigid uniformity of posture, losing sight of the fact that hands differ in conformation, and that no two persons left to themselves will grasp a pen or pencil in exactly the same way. Just here we may mention that the best and most successful teacher of penmanship we have ever met had no uniform rule for holding the pen; his method was to cause a pupil to sit erect with the right hand hanging freely by the side, the fingers taking the position into which the various muscles drew them; he would then place a penholder lightly across the thumb and direct the scholar to close the index and middle fingers upon it just closely enough to prevent it from falling to the floor. The position assumed in doing this he held to be the easiest and most natural, and therefore the best for the individual. In his classes at the close of a lesson, we never saw the pen thrown down in evident weariness, or the stretching and rubbing of the strained muscles that we have often seen under other systems, and we note the plan here because we have never seen it practiced or mentioned elsewhere.

Prolonged sitting at desks or tables which, whether from undue height or from improper relations of any kind between themselves and the seats, compel a constrained position of the head; the thoracic and abdominal cavities and the viscera therein contained,

can scarcely fail to be the cause of evil the extent of which it would be hard to estimate. Great as is the improvement that has been made in school-furniture within the past few years, and no one will deny that it has been very decided in all respects, with a single exception to be presently mentioned, much even of the best has serious defects, one of which may be demonstrated by a very simple experiment. Let a child be placed upon a modern school seat adapted to his size, his feet resting firmly on the floor and the body erect; examination by the hand will now show an almost entire want of any correlation between the curves of the spine and those of the back of the seat by which the spine is to be supported, and if the child be divested of his clothing, this lack of correlation will become too plainly visible to be overlooked. In some cases the two sets of curves recede from each other where they should approach most nearly. One feature of nearly all the desks and seats now made is very far from being an improvement, and must be condemned by all sanitarians, yet strangely enough we do not remember that attention has ever yet been called to it. We refer to the practice of uniting seat and desk so that the seat of one pupil forms a part of the desk behind him; there can be no justification whatever, upon sanitary grounds, of this union, the only object of which is to save space and which thereby leads to all the evils of over-crowding. In fact we have observed that this idea of economy of room is a leading one with several prominent manufacturers, and that too many devices by far have had this object in view rather than the physical welfare and comfort of the children who have been supposed to profit by them.

Perfect school desks and seats have not yet been made, great as is the advance in their patterns within the past twenty-five years, and some even of those who have made a special study of them from a sanitary point of view, have put forward some notions that seem to be founded on theoretical conceptions of what a child should be physically, rather than on actual measurements of actual children. Thus, in one paper with which we have recently met, the depth of seat from front to rear is set down at ten inches for children from nine to twelve years old. Placing a well-grown boy,

between five and six years of age, upon a chair, we measured carefully the depth of the space actually covered by his body, and found it to be exactly twelve inches; the perpendicular distance from the floor to the under side of the thigh, the feet resting flatly on the floor, was thirteen inches; hence a seat that this child could occupy with comfort would be not less than eleven inches deep from front to rear, and not more than twelve inches in height at the front edges. In a little work on School Hygiene, recently published, is given a table in which may be found a list of the proportionate heights of seats and desks, based on the height of children of different statures, the extremes being thirty-eight and one-half and sixty-eight and nine-tenths inches. We have not verified the correctness of the table by measurements of our own, but we judge the height of the seats there set down to be too great while the depth is not sufficient. However this may be, the principle upon which the table in question is constructed is the only correct one. Instead of the school-room being furnished with seats and desks all alike in height there should be not less than five different sizes in each room, and eight would be still better. The desk should be so high that its front edge, i. e., the edge next the pupil, shall be just on a level with the elbow of the child as he sits erect in front of it, and desk and seat should be so placed with reference to each other that a plumb line let fall from the edge of the desk shall just strike the edge of the seat or fall not more than an inch back thereof. Should it be needful for the student to stand up in his place for recitation or other purposes, the desk may be arranged to be turned down, as is now done by several manufacturers of school furniture, but we are by no means advocates for this plan, believing that such ample floor space should be allotted to each pupil that no difficulty can arise on this score. The allowance heretofore recommended, of twenty square feet per capita, will suffice, and this should be the minimum allotment in all grades higher than the primary; and we may say here, moreover, that such an allowance will prove one of the most powerful means of maintaining order and cleanliness in the school-room. By assigning to each child a definite territory, marked off by boundary lines drawn upon

the floor, giving him full control over it and making him responsible for its condition at all times, much will be done in forwarding his practical education, while the distance interposed between him and his neighbors will tend greatly to diminish that bane of many instructors known as "communicating."

It may be said that such changes as those just indicated lie rather within the province of school committees and boards of education than of teachers, and that they are not to be looked for until the men who compose such boards and committees are selected upon principles somewhat different from those which prevail at present. This is true in part only; the teachers are the real power behind the throne in this case, and their influence in these times is far greater than very many of themselves know or even suspect; when *they* have fully determined that changes even more radical than any sketched herein are necessary, it will not be long before they are made. "No American community ever refused adequate support to an energetic school board," and school boards generally look to the teachers to tell them what is wanted. Let the teachers "ask in faith, nothing doubting," and let them also, as they can easily do, back their demands with known and proven, but too generally concealed and neglected facts and figures; let them once gain the attention of the public for these, and the school board that will refuse their reasonable demands will be hard to find.

Even now, however, the teacher can do much toward preventing the evil results which may readily follow upon prolonged occupancy of seats as usually arranged, by so constructing his plan of study and recitation, and all the exercises of the school-room, as to permit and require frequent changes of position, as also by instructing his pupils in, and by illustrating in his own person those positions of the body which conduce to health, comfort and grace; if by some rare chance he should have a suffcient superficial area appropriated to each pupil, a brief time might advantageously be given to calisthenic exercises as often as once an hour.

And just here we may say that in speaking of calisthenics, we do not mean the exercises well described in the following extract taken from the "Sanitarian," an excellent monthly publication de*voted to matters* of public health:

School Hygiene.

"Six hundred children simultaneously stamped the right foot and scraped the left foot along the floor; the same number turned their heads to the right three times and to the left three times; they stood on one foot, and then they stood on the other; they beat their little chests with a force that would not have injured their own health or that of a mosquito; they tipped forward until the bottoms of their spines became prominent; they tipped backward until some of them lost their balance, and had their names set down in a little book as candidates for an additional exercise, calculated to increase the flow of blood to the surface, when the company should have gone, and finally all folded their arms and sat down, the same corpse-like gayety having been preserved at the beginning, middle and end of the exercise which was supposed to give them health and vigor enough to last until the same hour next day."

Such performances are worse than useless; the dead, mechanical uniformity of the drill from day to day, the utter lack of any interest on the part of pupils or teachers, the feeling on one side that they are silly and an enormous bore, and on the other that they are utterly valueless, all these tend to take from the so-called exercises even the small modicum of virtue which in the beginning they might have had, and from which, in judicious hands, something of real physical benefit might have been developed.

The system of gymnastic games introduced some twenty years ago by Dr. Lewis was a movement in the right direction; the scheme as a whole was not well adapted to the school-room, but a judicious combination of some of its features, with selections from the schemes of Ling (which has been used successfully in Swedish schools for many years), D'Alfonce and others might be wrought into a wholly unexceptionable system of school gymnastics, one which, properly carried out, could not fail to bring about a vast improvement in the physical health of the children in our public schools.

Forty-five minutes is the longest time that should be devoted to the recitation of any lesson by the most advanced students in our high schools; thirty minutes is preferable as a limit for the higher classes, while the middle grades should have no lesson assigned

that cannot be recited in twenty minutes, and the primary pupils should have a change of some kind once in fifteen minutes at most. When a class has become intensely interested in a subject — and we have had the good fortune to see many classes in that excellent condition,— the temptation to the teacher is very great to continue a little while longer; this point, however, when attained, is exactly that at which a lesson should be stopped for the time being,[1] and after a brief space given to some lively physical exercise, a new subject of study may be taken up, to be dropped in the same way at the proper time; four hours daily passed in this manner in the school room would advance the education of children far more rapidly than six hours daily, spent under the conditions which too often exist at present, while the advantages accruing to the physical condition at the same time would be by no means few or small.

The supervision of the sports and games of the play-ground as well as the more systematic exercises that may be introduced, should not be neglected by the teacher who has the sanitary welfare of his pupils at heart. We know only too well that the teacher, especially if he have a large school under his care, is obliged to occupy the time of recess by making up his records, or marking exercises, recitations, etc.; but we believe that in many instances a large amount of this kind of work may be profitably neglected. In the course of our own personal experience as a teacher, we have seen not a few broken limbs, as well as other and more serious casualties, every one of which might and probably would have been avoided had a teacher been present to oversee the games and plays in the course of which they occurred. Among these casualties have been several instances of hernia, and we are convinced that very few among the teachers of Wisconsin are aware of the ease with which this distressing and dangerous injury may

[1] Mr. Samuel Weller's theory of the art of letter-writing, as recorded in the Pickwick Papers, contains the true philosophy of this matter also. "That's rayther a sudden pull-up, ain't it, Sammy?" asked the elder Mr. Weller; "Not a bit on it," answered Sam; "she'll wish there was more, and *that's the great art o' letter writin'*."

School Hygiene.

be produced, or of the frequency with which it exists. Running, jumping, wrestling, lifting heavy weights, pulling upon ropes in the manner in which this is done in certain games, all are efficient in causing this serious mishap; no age and neither sex is exempt from it, although boys are more apt, from their vigorous methods of play and exercise, to suffer from it than are girls; the records of a single institution[1] show its occurrence in 11,780 individuals under 20 years of age, more than seven thousand of these being of about the average age of the children in our public schools, and the surgeons' examinations made during the civil war showed its existence in a very large proportion of cases. A condition so dangerous, which unfits the subject of it for many of the more active pursuits of life, and one so easily produced withal, merits more attention on the part of our teachers than, so far as our own knowledge goes, it has yet received. Personally we have often gathered the boys under our care together, and by the aid of the charts now very often to be found among school apparatus, or the figures given in any text-book on physiology, made the condition and its dangers clear, and pointed out the means whereby it may be avoided. Any intelligent child can be readily made to comprehend all that is needful concerning it, and the teacher will be none the worse for the study required to enable him to impart the knowledge.

Among the sports of the play ground is one, generally confined to girls, which, while a very desirable form of exercise when used in moderation, is yet liable to abuse, in which case serious organic injury may follow; we refer to the use of the skipping-rope, which in excess may cause grave disturbance and consequent disease of the heart and circulatory system generally, and all the long train of evils consequent upon injury to the spinal cord. Life-long suffering may be in many cases prevented by a few words of warning given to children at the proper time by a teacher who has gained their confidence and respect.

But the oversight of the play ground implies more than attention to those engaged in active sports; the periods of rest are those in

[1] The London Truss Society.

which injury is often received. Children become heated by active play and exercise, and will, unless prevented, throw off outer garments at the very time when they are most needed, or they will throw themselves down upon the ground, often damp and cold, or in various other ways run risks, the results of which only appear later on in life in various forms of disease.

In the school house, especially if it be built as too many school houses are built, with regard to little except the smallness of the cost at which a structure can be erected, sufficient in size for all the children of school age who live within a certain area to be crowded into it for a given number of hours daily, the teacher's work is arduous at the best, and its difficulties are greatly increased by the restlessness of some pupils, and the seeming stupidity of others, both engendered by the condition of the atmosphere which all are compelled to breathe. Sometimes a teacher with a half or quarter knowledge of the subject, in some conspicuous instances within our own personal knowledge, with even less than this, possessed with the single idea that fresh air must be had at any rate, pursues one of two courses, or vibrates from one to the other in a way that would be amusing were it not so serious, so deadly even at times, in its results. Fully convinced that *cold air* is of necessity *pure air*, and *vice versa*, he waits until the school room has become comfortably warm, and then throws open all doors and windows, regardless of the outdoor temperature or of the force of the wind, although this may be blowing a hurricane, keeping them open until the thermometer stands at the same point both outside and inside, then closing them for the time, to repeat the performance as soon as teeth have ceased to chatter and blue lips have resumed something like their normal appearance; the second method is to keep the windows constantly open at the top, if possible, but open at any rate, subjecting the pupils to a constant draught of cold air, ignoring or unheeding the dangers attendant thereupon. Both ways alike exhibit gross ignorance of the first principles of proper ventilation, notwithstanding which the instructor who practices them is usually the loudest in proclaiming the extent of his knowledge and the soundness of his practice.

Such persons — and that we have drawn no merely fanciful sketch hundreds of unfortunates will bear witness — are responsible to a very great degree for the aversion, the disgust even, with which many hear the word ventilation pronounced.

"To chill a room is by no means the same thing as to ventilate it, nor is it necessary in ventilating a room to chill it."[1] Even in edifices which have been originally constructed without any adequate provisions therefor, much may be done in the way of introducing fresh air, if not in the full measure demanded by the sanitarian, yet in quantity sufficient to effect a vast improvement upon the state of things too often existing, and of doing this in such a manner as to avoid all danger.

Among the devices which are effective for the purpose are the following: That of placing a strip of board two or three inches in width and equal in length to the breadth of the window, either under the lower sash, or better, at the top of the upper one, thereby leaving a space through which air will pass into the room, being directed upward constantly toward the ceiling, there to become gradually warmed and mingle by degrees with the remaining air of the room; where the sashes do not admit of being raised or lowered, a space for admitting air between them may be made by cutting away a portion of the top bar of the lower sash and the bottom bar of the upper one in such a way as to leave a narrow aperture at the junction of the two, equal in length to the width of the window; a simple valve may be provided by means of which one or more of the openings thus made may be closed should it be necessary. Sometimes the support of the upper sash may be removed and shortened or lowered an inch or so, in which case a narrow strip of board should be so attached to the top of the upper sash as to direct the incoming current of air upward. When the windows consist each of a single sash immovably fixed in the wall, as reports from a number of districts show is often the case, one or more panes of glass may be removed and their places supplied by a louvred arrangement, of equal size, which may be constructed of narrow

[1] Florence Nightingale's Notes upon Nursing.

strips of glass, such as can generally be obtained wherever window-glass is sold, and which are of no value whatever to the dealer. Panes of glass can thus be replaced without interfering with the light, and with very decided advantage to the purity of the internal atmosphere and the health of the occupants of the apartment.

For removing foul air, the device described by Dr. Reeve, on page 36, of the Fourth Annual Report of this board, may be adopted, or an opening may be made in the ceiling and fitted with a valve that can be opened or shut at pleasure; such a pipe, fitted with a cone or revolving cowl, as is frequently used in wood-sheds or summer-kitchens as a substitute for a chimney, will make a very effective outlet for foul air, and if it be painted black so as to absorb the heat of the sun's rays as they fall upon it, the air within it will be warmed and the velocity of the outflow very materially increased. An article from the pen of Rev. D. C. Jacokes, of Pontiac, Mich., published in the Report of the Board of Health of that state for 1879, describes a method by which a great improvement may be effected in the ventilation of almost any building to which it may be applied, at a cost, it is said, not exceeding ten dollars in any given case. It is essentially the combination of the device mentioned by Dr. Reeve with another also referred to on page 51, of the Fourth Annual Report of this board—a union of the plan of surrounding the stove with a jacket, furnished with a fresh air trunk, with that for the discharge of foul air by means of a pipe connected with the chimney. In Dr. Jacokes' excellent paper, which is worthy the careful attention of all interested in ventilation, all contingencies seem to have been considered and provided for, and plans and working details adapted to all classes of school buildings are given in great profusion.

Closely connected with the introduction of fresh air is the matter of keeping down the dust, so often to be met with in the school-room, and so especially detrimental to health. Whatever may be the fact in regard to ventilation, this is a thing entirely within the teacher's control and for which he may properly be held responsible. The one most prolific source of dust is the blackboard and the work done thereupon; we have seen again and again

children, rubber in one hand and chalk in the other, intent upon a black-board recitation, surrounded the while by a cloud of chalk dust which they could not help taking into their lungs with every breath they drew. One remedy for this state of things is the use of dustless crayons, which can be had at a small advance over the cost of the common chalk; if the district be too poor, or what is more probable, too parsimonious to make the change, the teacher must instruct the pupils in the methods of using the chalk so as to produce the smallest amount of dust, and damp rubbers must be used in erasing figures and diagrams from the board. Of the serious consequences following upon the continued breathing of a dusty atmosphere, it is wholly needless to say much here. Those who are interested in the matter may find much information concerning it in the section on The Hygiene of Occupation in Buck's Cyclopedia of Hygiene and Public Health; many facts taken from English Parliamentary Blue Books may be found, served up in the guise of attractive fiction, in Charles Reade's novel "Put Yourself in his Place."

The matter of properly lighting the school-room is one which is unfortunately little under the teacher's control, still he can do much not only to insure the comfort of his pupils while they are at work, but to prevent very much of the injury to eye-sight now suffered in our schools. It is but a short time ago that standing in a school-room in which great pains had been taken by a member of the State Board of Health in the supervision of the arrangements of seats and black-boards so that light should fall properly upon the work, we heard a lady of considerable local repute as a teacher express her opinion that the arrangements were very defective because the spaces between the windows had not been utilized (?) for black-board purposes, and great was her astonishment on hearing her proposed *improvement* decidedly condemned; it may be remarked in passing that the apartment in which this same lady presided was usually so foul in its atmosphere as to render it difficult for any one coming into it from the outer air to remain without feeling oppressed and sickened.

An idea very prevalent in the community generally is, that of a

near-sighted eye being necessarily a strong eye; so far is this from being true that the exact reverse is really the case.

"THE NEAR-SIGHTED EYE IS ALWAYS A SICK EYE," and it is also a mistake to suppose that advancing age will bring about such changes as will compensate for the defects of early life. Near-sightedness very often is progressive, and sometimes terminates in the loss of all sight. The story is by no means an exaggeration, of the man who, consulting a practical optician, was told that after glasses of a certain degree of power had proved ineffective, the next resource was a small but intelligent dog and a string. Children should be taught that near-sightedness may easily and certainly be produced by using the eyes with insufficient light or upon unduly small type. Among its active causes may also be named imperfect methods of illumination, in which are included windows directly in front of the pupil, "any thing that favors congestion of the head, as a bad position of the body, an over-heated room, wet or cold feet, indigestion, excessively prolonged study," the evil habit of crouching over a book with bent head, poring over a story-book or a lesson in a dim light, allowing a child to neglect out-door exercise because "he is so quiet and so perfectly happy whenever he gets hold of a book."

Says Dr. Edward G. Loring: "It can never be said too often that a near-sighted eye is always a sick eye, and a step further may safely be taken by saying that a near-sighted person is, as a rule, a sickly person, especially when the near-sightedness exists in a child, in whom it is often the result of a reduction of the general vital forces, and the expression of a laxity of tissue. The reason why a near-sighted person is apt to be a sickly person is not far to seek. A near-sighted boy, for instance, unless the trouble be very moderate, indeed, in degree, cannot compete successfully with his fellows in any of the games of youth where a nicely-balanced co-ordination is required, for the reason that most of them lie beyond his range of vision. Ridiculed by his companions for clumsiness and inaptitude, due to a physical defect of which neither he nor they are aware, he soon throws aside in disgust the healthful sports *in which he can* never hope to excel, and turns to books, not as a

disagreeable duty, but as a recreation, and finally what was at first a pastime becomes a passion, and reading for the mere sake of reading becomes a necessity, a craving which is not only not opposed by parents and teachers, but encouraged and fostered. Abstraction from fresh air and exercise are not the only evils thus engendered; the attitude in which the eyes are used is detrimental to the general health and the due development of important organs; the book is brought close to the eye, the head bent upon the chest or over the table, till the shoulders become curved, the chest contracted and the inspirations are shortened, rapid and insufficient. And not only the physical conditions, but the mental ones also are affected; a near-sighted child cannot see clearly the features of even his own family across the table, let alone those of an instructor across a school room, and hence cannot catch the ever-varying expression of the face by which ideas are emphasized, principles enforced, statements modified. He judges of men and their intentions rather by the sound of their voices than by the expression of their faces in connection therewith, and he is, for this reason, rather suspicious of strangers and over-confident with acquaintances, and this is even more true of places than of persons; thus he is timid and over-cautious in strange pathways, especially where the light is a little dim, while sometimes to his great bodily harm he will walk blindly into obstacles occurring in a familiar path in a way that seems incredible to those having normal sight.

"*In no possible way, either mental or physical, is a defect in vision a benefit or advantage to the individual who suffers from it.*"

The statement of the causes which tend to produce myopia will suggest also the measures which the teacher can take for its prevention. The child who shows any tendency thereto, and here it may be said that anyone is more or less near-sighted who cannot read letters measuring three-eighths inches in height at a distance of twenty feet,[1] should be carefully looked after, and any inclination

[1] The "test letters" used by oculists are all based upon a visual angle of five minutes; *i. e.*, upon the theory, which rests upon a vast number of experiments with eyes of all kinds, that the normal eye is able to recognize distinctly any object which subtends the above-named angle, at any given distance.

to overtask the eyes, whether by insufficient light, by means of too small print, or by prolonged examination of minute objects of any kind, should be discouraged and counteracted as far as possible.

Especially should too close confinement within doors and too prolonged study hours be guarded against, and abundant exercise in the open air should be firmly insisted upon whenever stress of weather does not absolutely preclude it. In the school room such a child should have all possible advantages of position as regards the light and distance from the teacher's platform, and this latter advantage should be shared by those who are known or even suspected to be partially deaf, a condition also by far more frequent in its occurrence than is generally supposed. Nor should it be forgotten that anything which tends to prevent a due and full supply of blood from reaching the brain also tends to induce near-sightedness; hence, no tight bands or collars about the neck should be tolerated, and the desk should be so arranged that the head need not be unduly bent over the work, whatever it may be.

And just here it may be remarked that the very general use of the sewing machine may have had its share in producing the large amount of myopia which has attracted the attention of oculists and sanitarians generally within the last few years. So far as our observation has gone, and it has been somewhat extensive, the position assumed by operators is especially favorable to the obstruction of the circulation in the neck and head, while the strain upon the eyes, which are usually brought as close to the work as possible, must be severe, even when kept up for comparatively short times — far more severe when it is continued for eight or ten hours daily; when, furthermore, as is very often the case, the machine is placed directly in front of a window in such wise that the light strikes directly into the eyes of the operator, which are wholly unprotected by shades or other means, it seems impossible to escape the conclusion that we have here a prolific source of mischief so far as the eyesight is concerned.

Under ordinary circumstances the work should not be nearer to the eye than fifteen or sixteen inches, and type equal in size to that with which this page is printed should be read, even by a per-

son decidedly near-sighted, at the greater distance without any difficulty, and if the light be insufficient to allow of this being done, all work requiring the use of the eyes should be laid aside for the time being. Children should be taught to avoid playing tricks of any kind with the eyes; squinting, turning the lids upward or downward, pressing upon the eyeballs with the fingers, rolling the eyes rapidly from side to side, and all such manœuvres, should be prevented, if need be, by means of punishment.

Pupils should be instructed to rest the eyes at frequent intervals by looking away from the book or other work toward some point as far distant as is practicable. Such a suggestion may startle some teachers, especially among those who pride themselves on having, their school-rooms look like work — "on having every one keep his eyes on his book without gawking around the school-room at every other minute,"[1] rather than on having a school wherein each pupil is possessed of the sound mind in a sound body, so often talked about but so rarely actually seen; nevertheless, the preservation of the sight in its normal condition demands that just this suggestion be carried into effect. When the eye is at rest, it is, or should be well known that it is accommodated for distant vision, and any arrangement of the lens for near objects is only produced and maintained by a voluntary effort which, after a time, becomes fatiguing; as soon, therefore, as any sensation of weariness is felt, the eye should be rested, and this can be accomplished only by releasing it from the strain under which it has been kept; how often this should be done in any case, only the individual himself can decide, and any attempt to decide it for him can lead to nothing except injury to the sight on the one hand, or deceit and hypocrisy on the other. It is entirely true that the eye, like every other organ of the body, can be trained by practice to endure fatigue, and to work upon minute objects for very prolonged periods of time, but great care must be exercised in so training it, or the attempt will result in permanent and serious injury.

A teacher may do much to save the eyesight of his pupils, more-

[1] A literal quotation from a teacher of this class.

over, by using proper care in making whatever blackboard diagrams and figures the course of instruction may render necessary of sufficient size to be readily seen, and by giving to all lines, whether vertical, horizontal or inclined, a sufficient breadth to insure their being visible without undue effort, *having regard in this particular to the sight of the most distant spectator.* For practical purposes it may be said that letters and figures measuring something less than two inches in length (precisely 1.84 inches) can be read by a normal eye at the distance of one hundred feet, provided that the lines of which they are composed have a breadth of not less than three-sixteenth inches; hence, letters and figures of those dimensions can probably be read across an ordinary school room even by a person having myopic vision in a pretty large degree. To secure a proper breadth of line the habit should be acquired of applying the crayon to the blackboard in such a way as to *make a line equal in breadth to its own diameter;* a little practice will enable the teacher to use the crayon in this way constantly.

Some authorities [1] advise very strongly the entire disuse of the slate and slate pencil in the school room, and the substitution therefor of pen and ink with white or tinted paper, for the reason that experiment has shown that writing upon a slate cannot be read unless it is one-fifth larger than writing executed with pen and ink upon paper, or is brought proportionately nearer to the eye.

It has been said that deafness is a defect of much more common occurrence than is generally suspected. By this, of course, an entire absence of all power of hearing is not meant, but such a deficiency as prevents the subject of it from hearing any words spoken in a voice distinctly audible at such distances as usually exist in our school rooms. Toward the prevention of deafness the teacher can generally do but little; he should, however, be qualified to give such general instructions upon the subject of the hygiene of the ear as will be of benefit to all whose hearing is still unimpaired.

Upon what he can do in the way of prevention we quote the following from the eighth annual report of the New York Ear Dis-

[1] Horner and others.

pensary,[1] commending it to the careful attention of every teacher: "Partial deafness or impairment of hearing is of so frequent occurrence, that probably *no class of a dozen children can be got together without at least one example of it*, and it greatly interferes with the efficiency of instruction. Attacks of inflammation of the ear frequently result from children being seated too near the stove, or from permitting them to be exposed to draughts of cold air from windows or doors. The ears are thereby rendered very sensitive, and earaches, accompanied by purulent discharges, frequently follow.

"It is strongly recommended that the following method of examination be applied to every scholar at his first entrance into the school, with the object of determining whether any deficiency of hearing exists, and the proper distance of the pupil from the teacher's desk in case the defect be present. Place the pupil at the row of seats furthest from the instructor's desk, and facing the teacher; now in the tone of voice usually employed in conducting the exercises of the school, request the pupil under examination to repeat several sentences dictated for the purpose; such sentences should be employed for this examination *as are rich in consonant sounds*, and thus any deficiency of hearing will become apparent very quickly. When any dullness of hearing is remarked, let the pupil gradually come nearer the teacher's position, the experiment being repeated at each approach. The distance at which he can hear everything that is said with perfect distinctness, as indicated by the process just described, will be that at which he should be seated."

What has been said of the eye is also true in some measure of the ear; where there is any weakness of the organ, anything that tends to lower the general health tends also toward the aggravation of the defect. It ought at the present day to be wholly needless to caution teachers against boxing or pulling the ears of children as a means of punishment, but there are still many who, through ignorance or thoughtlessness, resort to these means of correction

[1] From the pen of Samuel Sexton, M. D.

almost daily. It should never be forgotten that of all the organs of special sense, the ear is the most complicated; that there are yet many of its parts concerning the functions of which we are totally ignorant or in doubt, but that every new step taken, each new discovery made, shows more and more plainly the marvellous complexity and delicacy of the organ and the ease with which its peculiar power may be impaired or wholly destroyed, and the individual cut off from one of the most important channels of communication with his fellows.

Although not directly connected with the subject of school-hygiene generally, it may not be amiss here to call attention to the amount of injury to the hearing which occurs during the summer season from imprudent bathing. Dr. Sexton, author of the report already quoted, and chief surgeon of the New York Ear Dispensary, says, in a very elaborate paper published in a prominent medical periodical: "It is not easy to make an estimate of the number of aural cases (of injury) arising from bathing during a single season, but with the best data within reach, it is safe to say that the physicians of New York city see *no less than one thousand cases* of such injury during the bathing season, i. e., the months of May, June, July, August and September, and at least as many more occur in which no advice is sought."

He also calls attention to the fact that in all aquatic animals, without exception, the most careful provision is made to prevent all access of water to the external ear, arguing thence that such access is always attended with danger, and giving a list of many cases in support of his argument. He finally advises that bathing should be indulged in with some precaution against the admission of water to the auricle, and that such precaution of the most efficient kind be adopted by all who are in the habit of amusing themselves by diving, which practice, however, he considers dangerous in a very high degree. He also condemns the practices — and in this all sanitarians agree with him — of remaining too long in the water, and of bathing twice, thrice, or even more times daily. The whole period of an outdoor bath, including undressing and dressing, should not exceed thirty minutes at the utmost, and would be better reduced to fifteen or twenty minutes.

School Hygiene.

A knowledge of these facts may well be disseminated by teachers, and may be productive of great good.[1] And just here we may also refer to the several series of health manuals or primers recently published, both in the United States and in England, especially to those having direct reference to the hygiene of special senses, the greater part of which are written by men who are acknowledged masters of their subjects. From these little works, teachers may readily and cheaply obtain a large amount of valuable and trustworthy information upon matters relating to the conservation of health — information that may be of daily practical use in the school room.

In former papers we have alluded to the wretched character of the out-door accommodations attached to by far the larger proportion of Wisconsin school houses. So long as the criminal condition of things described in those papers is tolerated by the people of the state, there will be a most important responsibility resting upon our teachers; i. e., the responsibility of doing all that lies in their power to prevent the evil consequences which must inevitably result from such condition.

Take, for instance, a case where, for a school house accommodating between three hundred and four hundred pupils and always filled, sometimes over-crowded, the whole privy conveniences are contained in a single structure measuring ten by sixteen feet on the outside; such a building by the closest economy of space might be made to contain thirty seats though all internal screens must be sacrificed in so doing and an economy practiced which would not be tolerated elsewhere. Fifteen minutes upon the average is the time allowed as recess throughout the state, and the theory prevailing among the majority of teachers is, that the object of recess is to give an opportunity for attending to the calls of nature without interrupting the regular routine of the school by demands on

[1] Among the publications of this board is a small circular, giving instructions for the treatment of the apparently drowned, which should receive a wide circulation, especially among the older boys in our public schools, who might also be profitably drilled in the execution of its methods. It may be had on application therefor, free of all cost.

the part of individual scholars. Now, every one is well aware of the part played by habit in modifying the functions of the body, and of the further fact that habit is powerful in establishing periodicity in the performance of some of the most important of those functions; it is probable, moreover, that this tendency to periodicity is more readily established in children and young persons generally than in adults, by reason of the greater plasticity of the organization during the time of growth and development. Thus much being admitted, let us see what follows: The habit of relieving the bowels and bladder at a certain hour daily being once formed, and the accommodation for so doing within the space of time allowed therefor being wholly insufficient, the weaker will inevitably be pushed aside by the stronger, with one of two results, one of which, though only too familiar to mothers, may better be left to the imagination than described; in the other event, the will is called upon to aid the power of the restraining muscles, the act is postponed indefinitely, and the child suffers injury, in too many cases irremediable. It is far better that children should be allowed to leave the school room when necessary than that harm of this kind should be done even in a single case; far more so when the cases are many. Every one knows the discomfort, amounting often to actual pain, attendant upon forced postponement of the acts of defecation and micturition, discomfort and pain always badly borne by children and youth in whom vital processes, especially those of waste and repair, are active; it may very often be the case, moreover, that at a date prior to that of the child's first attendance at school the habit of relieving bowels or bladder at some hour other than that assigned for the general recess has already been established, a circumstance which would give a good and sufficient reason for indulgence. Let all proper restrictions be made, and all reasonable precaution taken against truancy and idleness; our personal practice was to require any time taken out of the regular school work to be made up at recess, and where we suspected strongly that idleness rather than actual need prompted a request for temporary absence, we required a double or triple return; real *necessity* will readily consent in the one case and the detention

may be remitted at the teacher's pleasure, while the idler will not usually fancy a prospective confinement while his schoolmates are enjoying liberty out doors. In any event, it is better that indulgence should be granted ten times a day needlessly rather than that any child should suffer the injury from failure to respond to imperative natural calls which we venture to say that every physician in active practice has seen in by far too many cases.

In several schools of which we have had some knowledge, the rule has prevailed that any pupil arriving at a time later than that set for the beginning of the daily exercises, shall be excluded from the building until the hour of recess, the ground assigned for the enforcement of such a regulation being that it tends toward the prevention of tardiness. We trust that the schools are not many in which this rule is in force; we are well convinced of the advantages of early teaching a child the virtue of punctuality, but we question very seriously whether any such method of inculcating the virtue in question has not disadvantages which seriously outweigh its merits.

Let us consider a case; a child perhaps naturally delicate in health, but ambitious to succeed in study, starts from home at an hour which he trusts will enable him to reach the school house in ample season; he has perhaps a mile, perhaps two miles to go, the weather is stormy, a heavy snow is falling rapidly and a strong wind is blowing; the mother would willingly have persuaded the child to remain at home for the day, but has given way, unwisely perhaps, to his strong desire to lose no time from school. He, too often *she*, struggles along the road against the wind, becoming each moment more and more exhausted from both physical exertion and mental worry, lest with all his efforts he shall be too late, and reaches the school house door at last, tired out, chilled to the very bones, with wet, cold feet, to find the door closed and to know that he must wait without in the storm and cold for an hour or more before he can gain admission, or start again on the weary journey homeward. This is no fanciful sketch, but a plain account of what must sometimes happen under the operation of the rule above described wherever it is strictly enforced. It is entirely true that we have

known of cases where its evil results were greatly lessened and its severity mitigated by the kindness of the good people living in the vicinity of the school house, who threw open their doors to children from a distance who were late, in cold or otherwise inclement weather, and in one instance by the repeated and direct violation of the regulation by a teacher who said, "When I see any of my little ones outside after nine o'clock I open the door and bring them in. I will not see a child standing out in the cold and suffering if I am able to bring him in,— rule or no rule," and we fully approved both her feeling and her practice.

Let mitigating circumstances be what they may, however, such a rule is well calculated to do great physical harm, to lay the foundation in some cases of serious disease, and to develop in yet others the germs of maladies which, under more favorable circumstances, might have lain dormant or been entirely eradicated. The only purpose that such a rule can serve is that of giving the school a factitious character, and one which is by no means deserved, for the punctuality of its students; while in the one case a pupil is marked on the register as being three, five, ten or more minutes late, he is in the other recorded as being in attendance so many quarter or half days, the actual fact being that the method of recording is a mere device, which deceives only very superficial observers, to avoid noticing a lack of punctuality that nevertheless exists, the pupil for this purpose being arbitrarily compelled to lose one, two or more recitations, and perhaps to endure as well the vicissitudes of the weather meanwhile.

This matter is one wholly within the control of the teacher, and wherever such a rule exists, especially in districts where the school house is remote from any dwellings, its operation should be suspended in winter at least, if it be not wholly abolished, and thus all danger be avoided.

The consideration of the barbarous regulation just discussed leads to that of another matter, somewhat allied to it, but one for which the teacher is not responsible, at least in the same way. Every one who has attained to years of discretion knows or should *know the* danger attendant upon sitting for two or three hours with

School Hygiene.

wet feet or damp clothing. Many of the children who attend our public schools, however, are too young to be aware of this danger, and, most unfortunately, many of our teachers are also too young to think for their pupils, and either to remind them to do for themselves, or to do for them what often needs doing in bad weather. Young children should be looked after when the roads are in bad condition by reason of rain or snow, as soon as they enter the school-room, and, if their feet are found to be wet or damp, whatever means are within reach to prevent ill consequences should be at once employed. We know full well that, as our school houses are at present constructed, it is a difficult matter, perhaps in many cases an impossible one, to give the care and attention needful in this respect, and therefore, in former papers we have urged the necessity of making provision in all school buildings for drying shoes and wet outer garments whenever the state of the weather renders it needful; but we believe that very much more might be done than is done at present were all our teachers as alert as some are to make the best use of existing facilities. Every successful teacher knows well how much attention is given in almost every community to suggestions emanating from the head of the school, and how much can thus be accomplished. Very many parents could be induced to provide an extra pair of stockings and other foot covering which might be kept at the school and worn in case of need during the process of drying the ordinary out-door wear, and some among the elder pupils might be deputized to oversee the changes at the proper time.

A matter wholly within the teacher's control, one which is much discussed withal, and one upon which the ideas generally entertained are exceedingly hazy, is the amount of moisture that shall be added to the air of an ordinary room by means of evaporation. In how many school-rooms can the pan of water be seen upon the top of the stove, having been placed there with some vague idea that the air must be artificially "moistened" in some way, to render it entirely fit for respiration! While it is entirely true that air may be rendered so dry, apparently, as to make it uncomfortable to breathe it, it is also true that such a condition is one very unlikely

to be reached in any ordinary school-room, and that it is a matter of very grave doubt, to say the least, whether the practice of keeping the air in such a room saturated with moisture is one at all conducive to health.

It is not, perhaps, generally known that even in school-rooms where no special means are provided for increasing the moisture of the atmosphere, the amount present never falls below 40 per cent. of that needed to saturate the air, and usually reaches a much higher figure; nor is the fact very widely understood that an atmosphere having a temperature of 65° to 75° Fah. may fall to a point several degrees lower, without the change being perceived, or producing any special discomfort, provided the amount of watery vapor therein is increased to nearly the point of saturation at the same time.

It must not be forgotten that a warm and moist atmosphere furnishes the most favorable conditions for decomposition of both animal and vegetable substances, and it must also be borne in mind that the skin and lungs are both great excretory organs, the former especially being a very active agent in removing superfluous water from the system, its activity in this respect being greatly increased by warmth. Dr. Winsor has calculated that in a room containing fifty persons, about three pints of water per hour are added to the air, through the agency of the skin and lungs, "a rate of evaporation quite equal to that of most furnaces supplied with an evaporating pan."

Yet more; in a paper read before the American Social Science Association in 1877, Dr. Winsor uses this language: "It must be a very dry atmosphere where fresh meats can be cured by simply hanging them in the open air, but countries and regions where this may be done are notoriously salubrious. The following passage contains the strongest statement concerning the sanitary properties of dry air with which I am acquainted. 'The Harmattan is a wind which blows from the interior of the Sahara to the west coast of Africa, sometimes lasting one day, sometimes fourteen days or more; during its prevalence everything dries up, leaves become so *parched* that they can be rubbed to dust between the fingers,

covers of books, though shut up in trunks, warp as if exposed to a fire, household furniture cracks, door-panels split and veneered-work flies to pieces. But another, and the most striking feature of the Harmattan is its salubrity; though occasioning disagreeable parching effects, it is highly conducive to health; those laboring under fevers generally recover under its influence, the feeble grow strong and malarial diseases disappear.'[1] Sprenger bears enthusiastic testimony to the healthful and invigorating qualities of the climate of Arabia, and Palgrave testifies to the same effect."

Not very long since we received a copy of a local newspaper in which was an account of an experiment apparently made for the purpose of determining the effect of watery vapor in the atmosphere upon the diffusion of heat through a given apartment. This experiment, which seems to have been made in the crudest possible way and without the employment of any of the means which give value to observations scientifically made, seeming not even to have been repeated under known conditions differing from those of its first performance, would hardly be worth notice here were it not for the fact that the article having reference to it appears to have attracted some attention among school officers and teachers generally, some among whom appear to think that by saturating the air of a room with watery vapor a considerable saving in fuel is to be effected while the health of the pupils and teachers may be also benefited,— though this last seems to be a merely secondary consideration.

So far as the question of health is concerned, what we have already said will indicate in part our own opinion upon the matter, and we shall endeavor to leave no room for doubt as to our position before we close; with regard to that of economy or saving of fuel there can be none whatever, as would be conclusively shown by a very elementary study of the laws of evaporation. Dr. Billings, of the National Board of Health, in a paper very recently published, has put this matter in a light so clear that we quote from him: "Simple dryness of the air is certainly not injurious to the

[1] Dr. Wyman.

health. At Fort Yuma, during April, May and June, when no rain falls, the average temperature day and night is 90° Fah., and the air is so dry that the skin becomes dry and hard, the hair crisp, and furniture falls to pieces; newspapers must be handled carefully or they will break, and a No. 2 Faber's pencil leaves no more trace on paper than a piece of anthracite. Yet this may go on for weeks in succession and no sickness will occur. * * * It is therefore evident that is not necessary to supply moisture enough to heated air to bring the percentage up to 70 (of the amount needed for total saturation). [1] *It is also to be noted that it will take the same amount of fuel; will cost as much, in other words, to furnish this percentage of moisture to air heated from* 32° *to* 70° *as it does to heat the air.* Moreover, in a room properly ventilated, under such circumstances it would be practically almost impossible to maintain such a percentage of moisture, owing to the great rapidity with which watery vapor diffuses itself through dry air and the condensation upon walls and windows."

The foregoing passage indicates very clearly the reason of the results supposed to have been obtained in the experiment already referred to, and renders further discussion of them wholly needless. Experiments, however, are not wanting which have been conducted with scrupulous care, and with the observation of all the refined precautions which modern science demands, including extension over a long space of time, and repetitions under all possible conditions. From these we select the tests made at the Boston City Hospital, a full account of which may be found in the Report of the State Board of Health and Charities of Massachusetts, for 1879. "The percentage of humidity was at times very low" (the instruments used were carefully tested, and the readings taken from the table of the United States Signal Service, which bureau also furnished the observations of the external air). "I believe that no discomfort has been felt or ill effects produced from the low relative humidity, even on occasions when there was only fifteen to twenty-one per cent. of saturation. Certainly, there is uniformly

[1] The italics are ours.

observed a remarkable absence of complaint of any kind, that can be ascribed to the condition of the air, and a peculiar feeling of its freshness and purity is frequently spoken of by those who enter the room. These conclusions do not accord with the theory that the uncomfortable sensations experienced in warm, dry rooms are due to any absence of moisture, but rather are corroborative of the probability that such sensations are really caused by an insufficient supply of fresh air."

Such facts as those above presented are worthy of the gravest consideration, especially by those who have been accustomed to the use of the evaporating pan. We know that there are authorities who claim that the air should contain not less than 70 per cent. of the amount of watery vapor necessary for its saturation, but so far as we are aware, these estimates are all made upon purely theoretical considerations, rather than upon the solid basis given by actual experiment. The conclusion to which the best men seem tending is, that the drier an atmosphere the better it is, from a sanitary standpoint; and the reasoning presented in support of this conclusion certainly has not as yet been answered, much less refuted.

From the most careful survey of the whole field that we have been able to make, we should advise under all the conditions usually to be found in the school room, the entire disuse of any appliances for artificially increasing the moisture of the air, and the substitution therefor of better methods of heating and ventilation. There can be no saving of fuel worth considering by employing such devices, and to subject children to the evils of foul air and crowd-poisoning, for the sake of enabling the district treasury to show an increase of five or ten dollars in the cash on hand at the end of a term, will prove very poor economy.

Yet another and a most important branch of our subject is yet to be discussed, a branch which concerns not only the health and lives of those directly attendant upon our schools, but oftentimes the health and lives of whole communities. We refer to contagious diseases and what the teacher can do in connection with them.

In some few instances local health boards have taken up this

matter, but in a very feeble and insufficient way; the duty of such boards all over the state is to make simple and practical regulations concerning contagious diseases among other things, which should be properly published, and thereafter rigidly and impartially enforced. In very few instances, however, has anything of this kind been done, and the teacher stands on the one hand exposed to the wrath of the parent whose child has been excluded from school under the suspicion, perhaps the certainty, that he is the subject of contagious disease, or, on the other, to the censure of a community because he has not arbitrarily exercised a power which they have never given him, and has not sent home a sick child. Still there are many things that the teacher can do and should do which would tend to limit, in many cases, the spread of contagious disease. Among these he should rigidly exclude the members of any family or the residents of any house in which any contagious disease is known to exist until such time as some reputable physician will certify that readmission is safe; when Scarlet Fever, Measles, Diphtheria or any dangerous disease similar in character is known to exist in the neighborhood any child who shows any unusual vivacity, uncommon fretfulness or irritability or any one in whom is observed one or more of the following conditions, i. e., an increased heat of the skin, flushed or pallid countenance, greater brilliancy or dullness of the eye than is usual; any one who is observed shivering — others being comfortably warm at the time — who complains of weariness, or a general sense of fatigue and malaise, of pain in the loins, headache, etc., or who asks frequent permission to drink or leave the school-room, any child in whom one or more of the above indications are observed should be at once sent home; it may not be that any specific disease is developing itself, but the grounds for suspicion in such a case are strong, and the child in such condition is assuredly better off at home and under competent medical care and parental supervision than he is at school.

Neither parents nor teachers should forget that the power of reproduction in these diseases does not cease with the convalescence of the patient. In Measles, at least ten days after that point *is reached,* the malady may be communicated, while in Scarlet

School Hygiene.

Fever a much longer time elapses before its power of imparting its specific contagion is exhausted. In all these diseases the poison from which they originate seems to cling very tenaciously to hair and woolen materials, especially those of loose and open texture, as well as to clothing generally; hence every precaution should be taken to insure the thorough disinfection of any such articles as were worn at the time of attack by contagious maladies, as also of the hair of the patient. The fatal results that may follow from a lack of care in this particular were terribly illustrated in Vermont, in the case of the Newark school house, where sixteen out of twenty-two children were stricken down with malignant Diphtheria within six days, and where forty-eight persons in all, out of a little community of ninety-two, suffered from that terrible malady, the original germs of which came from a single infected garment. And the records of this board and of others throughout the country contain instances similar in kind, though happily not so fatal, enough to establish beyond all doubt the fact that contagion is often spread through communities by carelessness on the part of parents in allowing garments to be worn which contain the specific form of poison which produces disease, and perhaps also by a lack of knowledge on the part of teachers that such poison can be so conveyed and disseminated.

In the event of the death of any pupil from contagious disease of any kind, his school-mates should be cautioned against the danger of attending the funeral, and the teacher should endeavor by all means in his power to prevent such attendance. It must be remembered that the indulgence of a sentiment, however tender and beautiful, even ennobling it may be, can be of no possible advantage to the dead, while it may be a source of no small danger to the living. It may be said that each one has an undoubted right to expose himself to danger for the sake of a sentiment, if he so chooses, but certainly he has no right to endanger the health and lives of others without their own consent, for the sake of gratifying a feeling, and most especially is this true when the gratification of personal feeling, and that alone, is concerned — where no good beyond this can possibly be accomplished, while serious harm may

very probably ensue. We are well aware that all that any teacher can do in such cases is to advise, but what teacher is there who does not know — rather what teacher is there who *does* know how far his influence reaches, what may be the real measure of his power in the community in which he dwells?

It would be well if, prior to the admission of any child to our public schools, he were required to produce a certificate of proper vaccination, or in default thereof, to be examined for evidences in the form of a proper cicatrix; if this were not present he should be obliged to undergo the operation by the medical officer of the town or district as an indispensable preliminary to admission. This course is universal upon the European Continent, and we believe an equivalent regulation exists in England also. There might possibly be a few who would object to the enforcement of this salutary rule in this country, but we believe that all objections would soon cease and that only favorable results would follow.

In many respects the state of Wisconsin has shown a wise care for the welfare of the rising generation; in former papers we have referred to her grand provisions for education, but in other matters also she has shown that she appreciates fully the value of childhood, and her determination that the vast privileges of that most precious and most important period of life shall be secured to every one born and brought up within her borders. She has provided that no child under twelve years of age shall be employed in any manufactory in the state; that no child may be compelled to labor in any factory for more than eight hours, or permitted to labor more than ten hours daily; that no child under fourteen may be so employed for more than seven months in any one year; and finally the school boards throughout the state are required to ascertain in any manner that they may deem expedient the condition, physical and mental, of all children within their jurisdictions who are not in attendance upon some public or private school, and also to prosecute the parents of all children for whose non-attendance satisfactory excuse is not given. Apart from these matters she has provided that no child shall be engaged in any pursuit whatever

by which life or limb shall be endangered, and proper penalties are prescribed for all violations of these laws.

Let her now turn her attention to the conditions shown to exist in some of the buildings in which her children are daily assembled, nominally for instruction, really for slow poisoning by overcrowding and foul air, buildings such as are to be found in the metropolis of the state, "dilapidated, old, without the slightest pretensions to school cónveniences, badly situated, unwholesome, I might say dangerous, which should be abandoned at once,"[1] buildings in which more than two hundred children are crowded into a room measuring thirty-nine by thirty-four feet, furnished with desks for one hundred and fifty, allowing only six and one-half square feet on the floor for each individual, no allowance whatever being made for furniture, etc. Let her once fully comprehend how Diphtheria, Measles and Scarlet Fever are spread through whole communities by the agency of such buildings; how homes are desolated, and many a Rachel is caused to mourn because her children are not; let all these, and many more things like these, be fully understood by Wisconsin and her people, and a demand will soon be made that neither school board nor legislature will be able to resist or refuse, that such blots upon her educational escutcheon shall be speedily erased.

Absolute perfection in all the appointments of our school houses we do not look for speedily; none the less, however, is it a duty to hold up a high standard of comparison; none the less shod we aim to present a lofty ideal, and strive, with all the might that God has given us, for its perfect realization.

[1] Vide Prof. McAllister, report published in *Milwaukee Sentinel*, October 25, 1880.

THE MANAGEMENT OF CONTAGIOUS DISEASES

IN THE CITY OF MILWAUKEE.

BY O. W. WIGHT, M. D., HEALTH COMMISSIONER.

[The following paper was originally prepared for the American Public Health Association. It is printed here by the kind permission of the Executive Committee of that organization:]

In response to an invitation by the president, I have undertaken to explain, in the briefest way, my method of managing contagious and infectious diseases in the city of Milwaukee.

The city charter empowers the commissioner of health "to forbid and prevent all communication with any house or family infected with any contagious or pestilential disease, except by means of physicians and nurses."

The charter also requires "each and every practicing physician in the city of Milwaukee to report in writing to the commissioner of health every patient he shall have laboring under any pestilential, contagious or infectious disease within twenty-four hours after he shall ascertain or suspect the nature of such disease."

The charter also enables the commissioner to prescribe the form of such reports and to issue general orders in regard to various matters pertaining to the public health.

A city ordinance provides that, "It shall be the duty of the commissioner of health to cause a notice, printed or written in large letters, to be placed upon all the outside doors of any house in the city of Milwaukee, in which any person may be affected or sick with small-pox, scarlet fever or diphtheria, upon which shall be written or printed the name of such disease; and such notice shall remain upon such house until the case shall cease to exist and such *house* shall have been thoroughly disinfected; and if any person or

persons shall deface, alter, mutilate, destroy or tear down such notice, without permission of the commissioner of health, such person or persons shall be liable for each offense to pay a fine of not less than twenty-five nor more than fifty dollars; and the occupant of any house upon which such notice shall be placed or posted as aforesaid shall be held responsible for the removal of the same, and if the same shall be removed without the permission of the commissioner of health, such occupant shall be subject to the like fine of not less than $25 nor more than $50, unless he shall notify the commissioner of health within twenty-four hours after the removal of the said notice."

The ordinance further provides that, "when from current rumors or from any other reason a suspicion exists" that such diseases prevail in any family or household, "it shall be the duty of the commissioner of health to ascertain personally whether such is the case," and to enforce the law.

At the beginning of my administration, in the spring of 1878, I issued a circular to all the practitioners in the city, notifying them that the law requiring them to report cases of contagious and infectious diseases within twenty-four hours would be strictly enforced. Half a dozen prompt prosecutions convinced the profession that the health department was in earnest. One quack, unable to give bail, lay in jail till the day of his trial. One haughty and fashionable "doctor" was driven on the witness stand, under cross-examination, to swear that he had no diploma and was a mere pretender.

Physicians in the city are gratuitiously furnished with postal-cards, on the backs of which is a blank to be filled, showing the name of the patient in full, sex, nationality of parents, patient's birthplace, number and street, ward, age, married or single, disease and date. It requires but a brief time to fill out this blank at the bedside. The postal-card can then be dropped into the first letter-box which the physician passes after leaving the house, and it is sure to reach the health officer within a few hours.

The following is the form of this blank:

Management of Contagious Diseases.

REPORT OF SICK CASES.

Name of patient in full.	Sex.	Parents' Nationality.	Patient's Birthplace.
1.....	.....	.....	.....
2.....	.....	.....	.....
3.....	.....	.....	.....

No. and street. Continued.	Ward.	Age.	Single or Married.	Disease.
1.....	.....	.....	.....	.....
2.....	.....	.....	.....	.....
3.....	.....	.....	.....	.....

Dated ——, 188—.

Maximum penalty for neglect to make daily report to the Commissioner of Health, $250.

When the card reaches the health office, the commissioner writes upon its margin the name of the assistant medical officer of health in whose district the case may be located, and at the same time fills out and signs the following order:

No. ——.

HEALTH DEPARTMENT OF THE CITY OF MILWAUKEE,
Milwaukee, ——, 188—.

To ——, M. D., Assistant Medical Officer of Health:

It having been reported to this office that there is infectious disease, to wit: ——, in the house known as No. —— street, —— ward, you will proceed without delay to placard said house according to the requirements of law, and at the same time to leave with the attendants the proper circular issued from this office for the sanitary management of said disease; to ascertain the number of persons exposed and the amount of exposure; to make diligent inquiry as to the contagious or other origin of the disease at that place; to make a careful personal examination of the sanitary condition of the premises and surroundings, and to make a written report to the commissioner of health on all the points above indicated, with such other suggestions as you may think advisable. The examiner will not, by word, look or act, interfere with the practice of the attending physician.

——, M. D., Commissioner of Health.

Management of Contagious Diseases.

The card and the order are passed to the secretary for registration and indexing. Twice daily the assistant medical officers report to the commissioner for duty, when they receive these cards and orders and hasten to placard houses as directed.

The placard is eleven by fourteen inches in size. The small-pox placard is printed in large black letters on a bright yellow ground; the scarlet fever on a red and the diphtheria on a lead-colored ground. On the top of the placard is the name of the disease in the largest possible letters, under which is the following warning: "$25 to $50 fine for removing this notice without authority from the commissioner of health. If removed, occupant of house must report to health office within twenty-four hours, under the same penalty." On the lower half of the placard the same thing is repeated in German, as about one-half the population are of that nationality.

At the time of placarding the house the assistant medical officer makes a sanitary inspection of the premises and reports in writing. His report, the order and the card, already mentioned, are pinned together and placed on the desk of the health commissioner for examination and approval. Such reports not infrequently give rise to additional orders to occupants or owners of the premises to clean vaults, fill up or drain low grounds, remove manure heaps or other filth, to empty and cleanse foul cisterns, to close up polluted wells, to overhaul defective plumbing, to make connections with the public sewer for the purpose of safely removing slops, wash-water and other liquids, etc.; all of which pertains to another branch of the administrative sanitary work of the department. These reports of the assistant medical officers are numbered, indexed and filed away by the secretary for future reference. In time they will accumulate sufficiently to form the basis of some important statistical generalizations.

As often as reports of contagious cases come in from the city practitioners, notice thereof is immediately sent by means of postal card blanks to the public and private schools in that neighborhood, the teachers of which are under orders not to admit pupils from infected houses under penalty of prompt prosecution in the criminal court. The same notice is also sent to the public library.

Management of Contagious Diseases.

When a case of contagious disease recovers, the attending physician usually sends notice to the health office, although he is not obliged by law to do so. If he neglects to perform this service the family is sure to give him a sinister blessing, for the placard then remains on the door for a month, when it is looked after by the health department. Some of the doctors, to please their patrons, have reported recovery suspiciously early; in which case a visitation is made by the health commissioner or one of his medical assistants, and, if suspicion is verified, a severe rebuke is administered to the practitioner who dares to trifle with the public safety. Burke, who murdered his fellow-creatures in order to sell their bodies for dissection, was a Christian and a gentleman in comparison with the medical fiend who connives at the spread of contagious disease in order to increase his practice.

When a case of infectious disease terminates, by recovery or death, a trained person is sent from the health office to disinfect the house and take down the placard. Disinfecting is done by the approved process of burning sulphur in the rooms, closed as tightly as possible. A reliable and careful man is employed for that special purpose.

Public funerals are strictly prohibited in cases of death by contagious diseases. All the undertakers and clergymen in the city are under stringent orders to this end. Two or three threats of arrest were sufficient to enforce the orders. Funerals, in such cases, are now quietly conducted at the homes of the deceased, and no young person is allowed to act as pall-bearer. The transition is very great in a city where, four years ago, small-pox funerals were held in churches. The enlightened majority of the clergy are entitled to credit for efficient aid in this part of the sanitary work.

Railroad officials, expressmen, public carriers, and all other persons are forbidden to bring to Milwaukee any person laboring under an infectious disease, or the remains of any persons having died of such a disease. There have been only two violations of this regulation in as many years. In one case a man brought clandestinely at night the remains of his child, deceased with scarlet fever, from a neighboring city. The imperative necessity of getting a burial

permit from the health office compelled the undertaker to reveal his employer, and the man fled from the cemetery to escape the sheriff. In the other case, a railroad train from Chicago was arrested at the city limits and a whole funeral cortege put off and ordered to take a suburban road to the extra-mural place of burial. These examples have been enough, and nobody seems desirous of repeating the experiment.

The circulars left with families by the assistant medical officers, at the time of placarding their houses, give pretty full directions for the hygienic management of the different infectious diseases. These circulars have been compiled from the best sources. For example, that concerning scarlet fever is in great part a copy of the excellent circular issued by the Massachusetts State Board of Health. In this way useful information concerning infectious diseases is diffused among the people. A family afflicted with a contagious malady is generally in a mood to receive such information and profit by it.

In dealing with small-pox, vaccination of all exposed persons is added to the procedure already described. In fact, there has not been a case of small-pox in Milwaukee since two years ago last July. When I took charge of the health office of the city, in the spring of 1878, I found small-pox in half a dozen different localities. It seemed determined to linger, till I made use of the extraordinary power conferred on the department by the legislature of the state in the municipal charter, "to forbid and prevent all communication with any house or family infected with any contagious or pestilential diseases, except by means of physicians and nurses." By such a rigid system of domiciliary quarantine the foul disease was "stamped out," and has not returned.

The advantages of the system may be briefly stated —

1. It enables the health department, and the public through the health department, to know every day in the year the exact number of cases of infectious diseases in the city and their precise location. Rumor and sensational exaggeration in regard to the prevalence of contagious maladies, which are liable to alarm the people needlessly, and to interfere with the pursuits of life, can

then be corrected by facts. And the truth of a violent epidemic cannot be suppressed in the interest of commerce to the criminal endangering of the outside world.

2. The exact percentage of mortality is constantly known, revealing the severity or mildness of an epidemic.

3. The system affords especial means of studying the conditions under which contagious diseases flourish, or to what extent they are influenced by sanitary surroundings.

4. It diminishes the spread of contagious diseases by protecting large congregations of children in schools from the presence of those bearing infection in their persons or clothes; by preventing exposure of the living at public funerals; by revealing to all who can see and read the places where such diseases may be caught, and by destroying the lingering germs of contagion in sick rooms by means of thorough disinfection. My experience convinces me that a community will give a wide berth to small-pox, scarlet fever or diphtheria if you will only let them know where it is. I have frequently seen quite small children cross over to the other side of the street when approaching a house on the door of which was placed a placard revealing the existence of contagious disease within. It is wicked to conceal from God's little ones the fountains of infectious suffering and death.

The difficulties of carrying out the system are considerable, but not insuperable.

1. While the majority of educated physicians are ready to co-operate with the health authority in carrying out any reasonable system of protecting the public from contagious diseases, the negligence of many and the perversity of a few must be overcome by the unflinching execution of law. To the credit of the profession in Milwaukee, it must be said that no one has raised the question of fees for reporting contagious diseases to the health office. An unseemly discussion of that question is now going on in Great Britain. The medical practitioner depends upon the patronage of the public, and should be willing to do for the public at large a service that costs very little time and trouble and is attended with no expense. It is a fortunate feature of the law that it requires

the attending physician to report a contagious disease as soon as it is suspected. For that reason the public receives the benefit of a doubt. The necessity of reporting to the health office all deaths, with the causes, in order to get a permit to bury, puts the doctor on his good behavior. A few attempts to return croup for diphtheria, spotted fever for scarlatina, etc, have been met with an order for a coroner's inquest. Inability to make a diagnosis has sometimes been urged as an excuse by delinquent quacks, but one or two criminal trials soon revealed to them that the responsibilities of assumed knowledge cannot be avoided by a plea of ignorance. In some instances doctors have prematurely reported recovery. The law of duration in contagious diseases is too well known to allow such heedlessness to escape notice and rebuke. It is sometimes disagreeable to supplement the mental and moral defects of a portion of the profession by the terror of criminal law, but faithful sanitary administration requires it.

2. At first the people objected to having their houses placarded, as a violation of personal liberty. A little argument convinced reasonable citizens that no man has the natural or acquired right to expose his neighbors to deadly contagious disease by concealing it in his own house. Personal liberty to give small-pox to somebody else had better be abridged as soon as possible. Personal liberty to send scarlet fever into a school with your child is rather diabolical than beneficent. Personal liberty to infect a church with a diphtheria corpse is tempting Providence to start an epidemic. But many were beyond the reach of argument. A fortunate accident of legislation solved the problem. The alternative was placed before them of quietly submitting to the placarding process, as provided by city ordinance, or of being subjected to absolute quarantine in their houses, as provided in the charter. A law-abiding community submitted, and to-day the system of placarding, if it were left to an election, would receive an overwhelming majority of votes in its favor. Experience proves its value in many ways to the citizen. He knows and feels that, by reason of it, his family is more secure against diseases that cost money, anxiety and sorrow.

Management of Contagious Diseases.

The defects of the system are already apparent to educated sanitarians.

1. So far as small-pox is concerned, proper vaccination and re-vaccination at suitable ages should be universal and compulsory. I am sorry to say that, in this respect, the sanitary code of Milwaukee is defective. Without vaccination suppression of the disease allows the greater accumulation of material for the conflagration of an epidemic, that sooner or later may get under way and defy all control. Every escape from scarlet fever is a positive gain, for susceptibility to the disease decreases with age. Diphtheria should be suppressed all the time, for one attack does not secure immunity in the future.

2. The efficiency of the system depends to a great extent on the willing or enforced co-operation of the medical profession. Just so far as the profession falls short of an ideal standard, must the system fail to reach its ideal value, however well it may be administered.

The system in Milwaukee is supplemented, as it should be, by a pest-house, to which the sick with contagious diseases, who have no homes, can be taken. With an efficient system of placarding and isolation, it is more economic, more humane, if not safer, to leave patients who have homes under the care of their families and friends. However excellent a hospital and its service may be, households are unwilling to give up any of their sick members to be nursed by unknown hands in a strange place. To force away children from parents, from brothers and sisters, and parents from children, and from one another, for the purpose of isolating infectious disease, exposes the public by transportation of the afflicted, diminishes the chances of recovery, outrages the unreasoning affections and invades the sanctity of home. Sanitation must reckon with the unalterable instincts of humanity and restrain itself within the boundaries of reasonable endeavor.

Therefore, in my judgment, the isolation of contagious and infectious diseases in the family, which is the unit of our political society and Christian civilization, is wisest and best. After long administrative training, we shall get the willing co-operation of

households and their chosen physicians. The day will come when exposure of others to our diseases will be recognized as a crime, the punishment of which will be demanded by the public conscience.

In the meantime we must combat superstition, diffuse rational knowledge, and protect the people against pestilence by the simplest and most effective means at our command, winning confidence by patient, kindly instruction, only using repression and the lash of law when we must.

DISEASED MEAT

AND ITS RELATIONS TO HEALTH.

BY HENRY P. WENZEL, M. D., OF LOMIRA, WISCONSIN.

Though physiologists are not yet definitely agreed as to the use of meat for food, or its necessity for the human economy, notwithstanding the teeth of man having both a *cutting* and grinding surface; many of the North American Indians attained a high physical development upon a vegetable diet; the laboring classes of Continental Europe rarely eat meat; that the healthy Scotch farmers live chiefly on oatmeal; that the former slaves in the southern states received meat rarely; and the Roman soldiers carried large weights and performed feats of great strength and endurance that astonished the world, without eating flesh; yet there are many reasons to believe that a partial flesh diet is the natural diet of man. Vegetarians have substituted milk and eggs for butcher's meat in their diet without suffering from it, but we must remember that milk and eggs contain the elements of animal food in large quantities. Meat is resolvable into a greater amount of force than the other nitrogenous foods.

Animal food is certainly necessary for hard mental labor, and the hard working laborer, enduring physical toil, performs a larger amount of work upon a partial meat diet, than upon a purely vegetable food. Liebig believes that the greater efficiency and endurance of American workmen over Europeans is due to meat. The Hindoo workmen employed on railroads do more labor with a meat diet. Dr. Kane, the arctic explorer, believes that the timely arrival of *fresh* meat saved the lives of some of his men. Dr. Livingstone tells us that, in South Africa, both the members of the expedition and the natives "eat anything to get animal food."

Diseased Meat.

Carpenter says, "animal flesh is in no way injurious; whilst so far as our evidence at present extends, this seems rather to favor the highest mental development." Haughton's experiments prove this, and M. Metz testifies that his boys in the reformatory school at Mettray become more manly on a liberal (meat) diet.

In Homer's time the poorer classes ate blood-sausages, and in parts of Germany this practice is carried on to-day for want of meat. Whatever physiological theories may prove, it is certain that meat contains nitrogenous, fatty and inorganic elements of food in an easily assimilable form, and its place cannot be supplied by any other substance.

In the earliest historical times meat was used for food, and in the laws of Moses the kinds of flesh, allowed the Jews for food, were prescribed. Moses was perhaps the first "Meat Inspector," and among the Israelites this practice has continued to the present time. They were certainly better protected against tainted meat than any other race of people. Sanitary laws grow apace, and those of the present day are much more perfect than those of the Israelitish or Hippocratean period. Meat may be diseased in the live animal, from acute or chronic diseases or infested with parasites; and carcasses are subject to decay.

"The contagious diseases of domesticated animals resemble in their mode of propagation the zymotic diseases which affect the human race." In some cases they do not produce their characteristic symptoms in man; yet, at times, cases develop, in some form of disease, which terminate fatally. The *Rinderpest* is a contagious typhoid fever affecting cattle; *Pleuro-Pneumonia* is essentially a cattle disease; *Small Pox* affects cattle and sheep; *Anthrax* affects cattle, sheep and swine; "*Maladie du sang*" or Splenic Apoplexy is a disease of oxen; "*Black leg*," "quarter evil," is a disease of calves; *Eczema Epizootica*, or "foot and mouth disease," one of the least fatal, but one of the most contagious diseases, affects cows, attacking the mucous membrane of the mouth and places devoid of hair. Several cases of *Herpes Contagiosa* are reported as following the use of milk derived from a cow infected with this disease. Sheep may suffer from a variety of *Rinderpest*, from

Small Pox and "*Braxy.*" Hog fever (Law), swine disease (Detmers), or hog cholera, is caused by a parasite, the *Stephanarus dentatus* of Cobbold and Law, or the *Bacillus Suis* of Detmers. The "Soldier," a disease resembling Scarlet Fever in man, also affects swine. Glanders and farcy affect horses, asses and mules. Each and every one of the diseases mentioned in animals has its analogue in man, and who can guarantee protection to health and life against the dangers that may arise after partaking of the flesh of animals so affected? Who will guarantee that the consumption of measly pork or other parasitic flesh will not give rise to tapeworm, trichina or hydatids?

PUTRID MEAT.

There is a vast difference of opinion concerning the evils resulting from partaking of decayed or putrid meat. The epicure prefers meat when it is a "little over-ripe," and many half civilized and savage people like flesh in an active state of decay for food. Prof. Gamgee says one-fifth of the meat sold at the meat market is tainted. Decroix states that putrid meat was devoured during the siege in Paris without baneful results, while Dr. Letheby says: "I have often had to investigate cases of mysterious diseases which were undoubtedly caused by unsound meat."

That decayed or putrid meat is dangerous is shown by the following instances: In 1839, 513 persons sat down to a cold collation in Zurich, composed of veal and ham somewhat decayed. Of these 421—*more than four-fifths of the whole assemblage*—were prostrated with typhoid fever shortly after. Another feast was held at Klotsen, near Zurich (1878), where the chief staple of food was veal, which, being decayed, much of it was given away to those who could not afford to pay for it. About 600 partook of this veal, and 290 were prostrated with typhoid fever. According to Prof. Hugenin this flesh was not only putrid, but also contained specific typhoid poison. Foderé believes that a diet of putrescent meat caused gangrene and scurvy during the siege of Mantua. Olliver reports six persons who ate putrid mutton and became violently *ill, and four died.* Sir R. Christison observes that 14 persons be-

came violently ill with diarrhœa and vomiting after partaking of veal so slightly decomposed that its appearance was perfectly healthy. Several years ago, several epidemics of fever, prostration, diarrhœa and vomiting broke out in one of the larger American hospitals, which were traced directly to the use of beef broths made from slightly decomposed beef. Geissler relates that a family of eight persons, partaking of musty bacon, became ill. And in Kangek, Greenland, at a mission station, 32 persons who partook of the putrid brain of a walrus, died. In the minutes of the Rock River Medical Society for May, 1874, Dr. S. Keller, of West Bend, reports several cases of typhoid fever resulting from decayed meat, with one death. May we not trace many mysterious and unaccountable diseases to this cause? Are not many diseases of this state due to the use of decayed meat for food?

Diarrhœa, vomiting, pain in the bowels and prostration are the prominent symptoms, following the use of decayed meat.

Salting partly checks putrefaction, and thorough cooking may sometimes destroy the virus of putrid meat; but not always.

Parkes observes: "It is only logical to conclude from general principles, that all diseases must affect the composition of flesh, and as active putrefactive changes must at all events deteriorate its nutritive value, it is of the utmost importance for health that these substances should be obtained in as sound a condition as possible."

Sharples says: "There has been no definite line laid down between good meat and bad meat. Meat which some people consider just ripe, would be condemned by others." "Meat once tainted is unfit for food." Letheby lays down the following rules for the detection of tainted meat: "Good meat should be between a pale pink and a light purple color; *dark purple indicates that the animal either had an acute fever or died with the blood in it.* It should have a marbled appearance; it should be firm to the touch and leave but little, if any, moisture on the finger. *Bad meat is wet, sodden and flabby, and the fat looks like jelly or parchment.* Good meat should have little or no disagreeable odor; *bad meat has a sickly cadaveric odor.* Good meat does not run to water when standing for a day or more, but dries on the surface. Good meat

shrinks or wastes but little in cooking; when dried at a temperature of boiling water, it should not lose more than 70 per cent., while bad meat loses much more. Good meat has a decided acid reaction — with test paper — bad meat is neutral or alkaline." This alkalinity is doubtless due to the evolution of ammonia during the putrefactive, chemical changes.

All meat, however tainted, should be condemned and so prepared that it becomes unfit for use. In Milwaukee such meat is destroyed with kerosene oil. In London, where 35 tons of putrid and diseased meat dressed for sale is often confiscated in one day, the meat is plunged into Dr. Sedgwick Saunders' chemical bath, which is composed as follows: Cooper's salts, 2 cwts.; sulphate of iron, ½ cwt.; phenic acid, 2 lbs.; water, 300 gal. (Fox.)

The flesh from animals suffering from chronic wasting diseases undergoes rapid putrefaction, and gives rise to sickness and diarrhœa, expending its fury on the gastro-intestinal tract; the flesh from animals that were overdriven, or died, also decays very rapidly, and presents an unwholesome appearance; this is caused by the blood being retained in the tissues.

Dr. Meymott Tidy says: "It is also the practice to condemn the flesh of animals that have died in consequence of parturition or were killed immediately before, during or soon after parturition, on presumable grounds that they were slaughtered in consequence of some disease or condition which might cause their death." In a case related by Wilson, a sheep was killed by a shepherd because it was too fat to lamb and sick in consequence. The meat was sold for a low price when seized and condemned as unfit for food. On Dr. Tidy's evidence the defendants were sentenced to pay a fine and costs, or be imprisoned for one month.

The flesh of animals feeding on certain plants may become poisonous. The flesh of hares feeding on *rhododendron chrysanthemum* has exerted poisonous effects; pheasants fed on *laurel* have caused illness when eaten; and a case is recorded where the flesh of a turkey proved poisonous, yet on analysis no poison could be found. Certain shellfish have produced fatal results when eaten, also certain fish. And sailors eating the yellow-billed sprat have

died with the fish in their mouths, or soon after. In 1842 a whole family was poisoned at Toulouse, in France, by a dish of snails gathered from a poisonous shrub.

Water used from receptacles that contained putrid meat may prove disastrous, as in a large city a few years ago. A family of five or six persons partook of soup in which water from a barrel that had contained putrid meat, and had not been properly cleansed, was used. The whole family was seriously prostrated and two cases almost proved fatal.

Tainted meat is bad, but the sausage poison is worst of all. Tainted sausages become soft in the interior and are acid to test paper, probably caused by the chemical changes of the fatty acids (rancid). The mouldiness of sausages is caused by a cryptogamic fungus. Letheby says the poisonous properties are generally observed in April, but the writer has observed them in June, in which month a butcher sold 25 pounds spoiled sausages, of which some were eaten; illness immediately followed. This should be prohibited by rigid legislation. It is as dangerous to be attacked by a putrid sausage as by a loaded shotgun.

The symptoms of sausage poisoning are pain in the stomach, vomiting, diarrhœa, dryness of mouth and nose, profound depression, cold limbs, frequent fainting, perhaps death. Sausages are usually so heavily salted and spiced that slight putrefaction is not detected. Besides they are generally eaten raw, or but partly cooked. Meat that is unfit for other use is made into sausages. Letheby says that (1860) a forequarter of a beef cow was purchased by a sausage maker, and at once converted into sausage meat; 66 persons ate of the meat, 64 were prostrated with sickness, diarrhœa and great prostration of the vital powers; one died. On examination the meat was found diseased.

There is greater danger of serious illness from eating sausages than from meat, because the knackers can always buy diseased meat or parasitic meat cheap; thus tapeworm, trichina, echinococei, etc., may be carried into the human system, not only from infected meat contained in the envelope, but the gut itself, which is seldom properly prepared, may be the carrier of disease or parasites.

Diseased Meat.

PARASITES.

The most frequent parasitic disease is trichiniasis (trichina disease), which sometimes follows the ingestion of trichinased pork. The hog is the principal host which harbors these parasites in its body; man is infected by eating trichinous pork. Some other animals, as the rabbit, fox, wolf, etc., are said to be infected, but it is conceded that the rat is the trichina carrier. Rats frequent pigsties, and swine devour them; in this way they may become infected, or the small worm may be expelled with the dejecta of other animals, and be carried into the systems of their host with water or food.

Trichina spiralis occurs in man in the undeveloped and developed states. In the immature state the body is filiform, and has no internal organs besides the intestinal canal, or only rudimentary ones. The mature worm is about 1-30 inch long by 1-700 inch diameter, and is twice or thrice coiled spirally, occupying the voluntary, striated muscular fibres of men and animals, within very small, elliptical, thick-walled capsules, which become calcareous and inclose the worm in a hermit-like cell. When the trichinosed flesh is eaten, the calcareous cyst is rapidly dissolved in the stomach and the worm set free. Finding itself in the midst of nourishing food, it grows rapidly, reaching sexual maturity on the second day; on the sixth day the females bring forth from 500 to 1,000 filamentous embryos. The young immediately set forth on their wanderings, pierce the walls of the stomach and intestines, and migrate into the muscular tissues of all parts of the body. Here they "make themselves at home," and produce lassitude, loss of appetite, and pains, followed by vomiting and diarrhœa; later on fever sets in, which increases in severity, the patient complains of excruciating pains, not unlike those of acute inflammatory rheumatism, fearing to move the limbs, and lying motionless on the back. If death do not carry off the patient, nature may come to the rescue by encapsulating the parasite; then it is harmless.

Trichiniasis is a fatal disease; there is no known remedy that will cure it.

Although discovered by Owen in 1835, trichinæ were considered

a curiosity until Zanker, of Dresden, discovered the pathology of the disease (1860). How many perished of trichiniasis before this remarkable discovery will never be known, and it required epidemics of the disease, as the "sweating disease," or "black death," such as occurred at Wetzleben in 1849-50, to reveal the presence of parasites as the cause of the mysterious disease.

Among the earliest epidemics in Wurtemberg was that in 1675, the patients partaking of pickled and smoked ham. Many epidemics have occurred since. In Blatenburg, 1859–60–62, sixty were taken sick, two died; in Magdeburg, 1860, 300 sickened, twelve died; in Hettstadt, 1863, 103 sat down to a banquet, nearly all sickened within a few days, and twenty died within the month. The disease was traced to the eating of raw ham and sausages made from an infected pig. The most extensive and fatal epidemic known occurred at Hedersleben, in Germany, 1865, a town of 2,000 inhabitants; 337 of the population were affected and 101 died. The first authentic trichinæ disease in the United States occurred in New York, 1864; one died. In Marion, Ia., 1866, nine persons partook of raw, sliced ham, all sickened and five died. A number of cases have been reported in Michigan, Massachusetts and other states. Trichinosed pork sold a few years ago, in Milwaukee, caused quite an excitement.

Dr. Reinhart states that 39 epidemics, with 1,267 cases of trichiniasis, occurred during the years 1860 to 1875; only a small portion was caused from eating raw pork; one-half occurred after eating smoked sausages, with two deaths; among 340 who partook of well-prepared "Brat-wurste," eight died. Dr. George Sutton, of Aurora, Indiana, states that from three to sixteen per cent. of the hogs killed in Southeastern Indiana are infested with trichinæ. Out of 1,250 American hams imported at Heilbroun, eight per cent. were found trichinosed.

Can trichinæ be detected? Yes; with a good microscope, sometimes with the naked eye. A small slice of the parasitic flesh is immersed, for a short time, in a solution of caustic potash (1–8) to clear up the muscle; the cyst may be better brought out by touching it with muriatic acid. Care should be taken not to confound

trichina cysts with "psorosperums" or "Rainey's capsules." Cameron estimates that he found 250 trichinæ in a piece of tongue weighing only ten grains; and Prof. Dalton believes that, in a specimen examined by him, there were 85,000 in a cubic inch of muscle. Trichinæ are most found in the muscles of pigs' eyes, and in the diaphragm; in Germany the eye is always examined by the inspector. How can trichinæ be destroyed? By thoroughly cooking the meat. Salting and smoking does not affect them. Mosler found them alive in a ham kept for ten months.

How can trichiniasis be avoided? By abstaining from all raw meat and sausage. If the Germans ate less "Westphaler schinken," or "Servalet," or "Metwurst," the epidemics would be very rare indeed.

Pig sties should be kept clean; rats destroyed if they infest the habitation of swine; hogs should not be fed with offal from other hogs or slaughter house refuse, nor with other pigs' flesh.

Cysticercus cellulosa are small parasites with hooklets inclosed in bladders, scattered through all parts of the pig, but are most numerous beneath the skin, under which they produce small elevations called "measle moulds." The disease has been popularly called "measles," "measly pork," which was first mentioned by Aristophanes and known to Aristotle. They migrate, in man, in two ways from the intestinal canal; either piercing their way through the soft parts, or get into the circulation. Their migration may cause illness and pain; there is no danger unless they get into a sensitive or vital part, as, the eye, brain, spinal cord, heart, liver, etc. Greissinger states that they may give rise to insanity when lodged in the brain.

The infection with cysticerci — as found in swine — in case of man, is extremely rare in this country. In Europe it is found in the lower, filthy classes.

They more frequently give rise *taenia solium*, a species of tapeworm, ten or more feet long! When the segments of these are discharged with the human excreta, they are eaten by the hogs, and, according to Leuckhart, in a few days a certain number of the *ova become* developed into cysticerci (about one in 1,340).

Diseased Meat.

This parasite forms for itself a cyst or bladder, filled with clear, serous fluid, from ⅛ to ½ inch in length. The whole process of development lasts from 2 to 3 months. The cyst becomes surrounded with a cellular capsule, except, sometimes, in the brain. If undisturbed the animal may live in this form from 3 to 6 years, then it dies, undergoes fatty degeneration, and the soft parts are absorbed, leaving a chalky concretion in which, according to Stich, the characteristic hooklets of the larva are found. There is no remedy known for them.

A hog infected with cysticerci has broad shoulders, narrow loins and thickened neck; there may be hoarseness, difficult breathing and lameness; the inner eyelids are inflamed, and there is a yellow spot in the inner angles of the eyes, and "measle moulds" on the skin. The creature lives in the hog, as in man, from 3 to 6 years. In Germany and France the inspectors always examine the inner surface of the eyelids and the under surface of the tongue, where it is always found. The only safe way for destruction of these parasites is thorough cooking at 192° F. (Flint); thorough salting only destroys those near the surface. It is stated that cysticerci have been found alive in melted lard.

All "measly" pork should be condemned and destroyed.

A species of tapeworm is also found in man, and sometimes acquires a length of 60 feet or more; the writer saw one 123 feet long! They resemble taenia solium so much in appearance, that they were mistaken for one another until Kuechenmeister, 1852, pointed out the difference. They are the mature parasite of *cysticercus tænia mediocancellata*, which is only found in beef and veal. Numerous cases of their occurrence have been reported in Russia and Abyssinia, where large quantities of raw beef are consumed. Dr. Leidy has reported a case occurring in Philadelphia, following the use of raw beef sausage. Dr. Larabee related another case to the writer, and many cases have been reported from feeding raw beef to children.

The cyst is similar to cysticercus cellulosa, but smaller, and difficult of detection.

Taenia ecchinococcus, hydatid disease, is a most dangerous para-

sitic disease. It is found in the monkey, ox, cow, sheep, hare, etc., and very frequently in dogs, being most frequent in countries where large numbers of dogs are kept, and where they are used in herding sheep. Dogs, cats and wolves eat the offal of sheep and become infected with the corresponding tapeworm. The larva when ingested is set free, the tapeworm forms in the dog's intestines, its segments are cast off with the excreta, and, somehow, find their way (possibly by contaminated water) into the intestinal tract of man, and are, in turn, again produced in the larval form, consisting of a series of cysts, one within another, sometimes singly, frequently in larger numbers, forming hydatids of the liver, lung, brain, spinal cord, eyes, and other organs. They multiply by endogenesis — one cyst growing within another — and the parent cyst may attain the size of a man's head (Trousseau).

Hydatid disease is infrequent in this country, but common and fatal in Iceland. The cysticercus itself is one two-hundredth inch and the corresponding tapeworm one-fourth inch long (Beale). The symptoms in man depend on the organ infested.

There is no cure if the cyst cannot be reached by the aspirator or by the surgeon's knife.

Liver flukes are found in the livers of sheep affected with the "rot." Animals infected with this parasite yield inferior meat. They are rarely, if ever, found in man.

ACUTE INFECTIOUS OR CONTAGIOUS DISEASES.

Pleuro-pneumonia affects only cattle. There are two distinct diseases, one is similar to that of man and non-contagious; the other a highly contagious and fatal malady, which destroys large herds of cattle in Europe and this country, and probably destroys more animals than any other known disease. Both in Europe and this country, it has been proven that thousands of cattle, sick or dead of this disease, find their way to the butcher's block and are sold as sound beef. Some assert that this beef has been freely used as food without dangerous results following; on the other hand, many cases of illness and even death have been reported from its use. Dr. Livingstone states that he has seen both Euro-

peans and natives — in Africa — severely ill after partaking of the flesh of cattle, so slightly sick with pleuro-pneumonia, that the disease was scarcely noticeable and the flesh apparently sound. That carbuncles prostrated them, and if the use of the meat was persisted in, death followed; and that thorough cooking did not destroy the poisonous virus! Since the importation of pleuro-pneumonia into England from Holland, in 1842, the death-rate increased from 1 to 6.2 per 10,000 from carbuncle; and from 2.5 to 8.1 per 10,000 from phlegmon and boils in five years.

The symptoms of pleuro-pneumonia in cattle are: Shivering, increased, full pulse, cough, increase of temperature to 105° F. or more; later on, the pulse becomes weak and indistinct. There are loud respiratory murmurs, and the nasal cartilages rise spasmodically; the eyes become bloodshot; foam issues from the mouth; pressure on the spine causes pain; friction sounds and bronchitic rales are distinct; there may be diarrhœa. In coughing, calves will stretch the head on a level with the neck. The post mortem appearances are marked: Extensive pleuritic adhesions; false membranes in the trachea; sometimes there are large abscesses in the lungs; the lungs are enormously enlarged — sometimes weighing seventy pounds; Cameron found them weighing 100 pounds in one case — and hepatized. A day after death, it is difficult to detect this diseased from healthy flesh; but it is alkaline to test paper (Letheby). When this meat is hung up in an ice box near healthy meat, the latter soon decays.

Anthrax, malignant erysipelas, renders the flesh of animals so diseased dangerous. Menschel has reported cases of serious illness, and Simon relates the case of a family of nine persons who partook of the flesh of a bullock killed in a low stage of the disease; two died.

Charbon — carbuncular disease — is so dangerous that Prof. Cressy, of Amherst, advises destruction of the whole carcass, including the hide.

Dr. M. Petry, in a communication to the Belgian Royal Academy of Medicine — 1872 — refers to the frequent production of carbuncular diseases from the use of diseased flesh, and gives the history

of an outbreak of malignant pustule among the inhabitants of Condroz, which was traced to the consumption of diseased flesh of an ox affected with charbon.

Rinderpest is a disease of cattle in the Russian steppe region, and has not yet appeared in this country. Parent Duchatelet states that large quantities of so diseased meat were consumed in France without any bad effects. Pappenheim asserts that there is no danger in using the flesh for food, and Bruecke, of Vienna, says that the Bohemian peasants dug up, cooked and ate such meat after it had been condemned and buried, without ill results, but Dr. Letheby says "it would be very dangerous to permit the unrestricted sale of such meat in all stages of the disease." It is also declared unwholesome by the Belgian Academy.

"Braxy" mutton has been used without ill results when salted and kept for a long time.

The flesh of cattle, suffering from *splenic apoplexy* appears to be damaged but little, yet dogs and pigs die from eating the meat, although thoroughly cooked. Many cases of serious illness, in man, are reported, from partaking of this diseased meat. Splenic apoplexy is evidently another form of anthrax.

Spanish fever, or the *Texas cattle plague*, is an American fever which has destroyed large herds of cattle time and again. It is said to be in a chronic form until the cattle are brought up north, when the acute (epidemic) form is developed. Prof. Gamgee says: "I unhesitatingly asserted, which I repeat now, that the meat is not poisonous, and is incapable of injuring human beings." But the New York Board of Health attribute the increased mortality from diarrhœal disorders and the suddenness of death to meat used from cattle affected with Spanish fever (splenic fever). Dr. E. Harris says: * * * "It must be here stated that no medical officer presumed that the Texas cattle plague would reproduce itself in the human family. But it must be believed that the rapidly and utterly putrefactive effect of the disease in the fatal stage of it clearly pronounces upon the unfitness of such dying cattle for food." "Who would knowingly eat the beef of cattle with such pestiferous breath as these sick Texas cattle have?"

Diseased Meat.

Hog cholera occurs in swine. It is stated that the flesh derived from the sick has produced no ill effects when used. But the flesh of cholera-diseased or dead hogs should always be condemned, as is done in Germany. Thousands of hogs in the dying stage, or dead, of this disease, are sent to rendering establishments, and the fat derived from them is sold as a pure article of lard. The writer has also heard of instances where such diseased flesh was offered for sale.

"With the *small-pox* of sheep it is different. The flesh of the affected animal is pale, moist, emitting a nauseous odor, and almost immediately giving rise to sickness in people who eat it."

Glanders and *farcy* are diseases of the horse, ass and mule; they are eminently contagious to animals and to man. Decroix states that he has seen hundreds of glandered horses devoured during the siege of Paris, and has eaten of such meat himself without evil consequences. Thousands of horses are slaughtered annually in France and Germany, but it is doubtful that the equine race will ever be killed for food in this country. Americans prefer to kill their horses on the race course.

Medicines administered to cattle locally or internally may be found in flesh after death; and arsenic and antimony, though applied locally, have produced dangerous symptoms in those who partook of the flesh. "Three hundred and one persons once ate of the meat of an ox that had taken two ounces of tartar emetic before being slaughtered; of these 107 suffered from vomiting and purging—one died. Antimony was found in the tissues of the ox, and in the stomach of the man who died." (Kreutzer.)

Pappenheim states that the feeding of swine with putrid animal matter produces poisonous food, and Parkes has remarked that the pork of hogs that had been fed on offal, not always fresh, produced diarrhœa among the soldiers.

CONDEMNED MEAT.

Here we give a few items of the quantity of meat condemned for a certain time and in a few places; the amount is simply enormous.

Diseased Meat.

In London about 30 to 35 tons of meat are condemned daily.

In Washington during six months there were condemned: 6 cattle, 8 sheep, 11 calves, 1 hog, 7 tons of meat.

The value of meat condemned in Cincinnati for 1874–5–6–8–9 is $67,087.28.

Pittsburg condemned 1876, 10,095 lbs. meat and fish, etc.

Chicago condemned in 1870–1–2–3, 693 qrs. beef, 215 carcasses mutton, 76 calves, 95 hogs, etc.; in 1874–5, more than half a million pounds of meat and fish. In 1877 the total weight of all condemned meat was 177,789 lbs, and in 1878 there was condemned during the year 243,086 lbs.

How much meat is condemned in this state outside of Milwaukee? None! Yet cattle, sheep and hogs are often brought to market in a deplorable condition, and in cities as large as Fond du Lac, *putrid* meat has been sold from the butcher's block, and in a *village* as small as Brownsville putrid sausages (25 lbs.) were sold by a Mayville butcher. The writer has sent back to the butcher's shop putrid meat more than once while he resided in Theresa, and there are no doubt thousands who have had similar observations.

PROTECTION AGAINST DISEASED OR TAINTED MEAT.

1. Hitherto no meat has been inspected anywhere in this state, excepting a few cities, nor have animals, intended for slaughter, been visited and examined by an inspector.

2. An act should be passed regulating the slaughtering establishments, and butcher shops, through some competent inspector, appointed according to law, and such a law should be rigidly enforced. It should prescribe the duties of said inspectors, regulate the fine and costs of offense against the public health, and define the kinds of meat, tainted or diseased, forbidden to be offered for sale at any time or place. The penalty should be heavy.

3. All tainted, putrid or diseased meat offered for sale, as food, should be condemned and destroyed.

4. Calves and lambs under a certain age (at least 4 to 5 weeks) should not be allowed as food, and any such young meat offered for sale should be unequivocally condemned.

Diseased Meat.

5. We have alluded to the dangers resulting from tainted, diseased, putrid meat, or flesh filled with parasites; any person offering to barter, sell or exchange such meat, however cheap, should be prosecuted for a misdemeanor, and compelled to pay fine and costs of prosecution, and the meat should be confiscated and destroyed.

6. The feeding of animals for slaughter, with putrid materials or offal, should be rigorously prohibited.

7. The running or chasing of cattle within 24 hours before slaughter should be prohibited by law; and persons offering the carcasses or flesh of parturient cattle should be heavily fined.

8. Live stock should be carefully inspected for acute diseases, chronic diseases and parasitic infection, and in doubtful cases the meat should be carefully examined under the microscope.

9. No person should patronize any vendor of meat who does not keep pure and sound flesh for food; or who keeps his slaughter house and butcher shop in an unclean or filthy condition.

Sections 4599, 4600, 4605, and 4608 of the Revised Statutes are all in force, and, with chapter 57, are sufficient to cover many of the above suggestions.

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Kerosene.

KEROSENE.

By J. T. REEVE, M. D., of Appleton.

[NOTE.—The following paper has been written for this report at the request of the board. It does not profess to present anything especially new, but aims to give such facts as are of general interest concerning an article of almost universal use, and one upon which, outside of the larger cities, the people are almost entirely dependent for light-giving purposes.

Appended to the paper are some suggestions concerning the preparation necessary for the most satisfactory use of high test oils, and hints looking to the greatest degree of safety to be obtained in the use of any oil.]

That an artificial light is a necessity of human life is a statement that needs no argument, and there exists neither record nor tradition of a time when there has not been some means of obtaining it. Bearing a part in advancing civilization, in developing its industries, and in advancing its comforts that is wholly beyond the power of computation. the search for that material which would be best fitted for light-giving purposes has taxed the inventive genius of man in all ages, and the whole range of the animal and vegetable kingdoms seem well nigh to have been exhausted in this search. It would be interesting to trace, so far as it would be possible to do so, the history of all the efforts made in this direction back until they should be lost in antiquity; to note the successive steps of progress from the burning brand or resinous torch of our forefathers to the electric light of to-day; but the purpose and plan of the present paper is a much more modest one, its aim being to give simply and briefly some of the most prominent and interesting facts in the history and utilization of one of the most abundant of natural productions, which, within the latter half of the present century, has practically superseded nearly all other illuminating agents, and which has completely revolutionized the methods of illumination throughout the civilized world.

Kerosene.

Accustomed as we are to the daily use of the fluid known as kerosene, which possesses unsurpassed qualities of convenience as an illuminant and which is furnished in our day at such insignificant cost that the blessing of a brilliant light may be had even in the dwelling of the poorest, it is difficult for us to understand how it was that the existence and general properties of the petroleum from which it is derived should have been so long known without appreciation of its value and importance. It is, however, an unquestionable fact that springs and fountains furnishing petroleum were known and used to some extent for illuminating purposes centuries before the Christian era, and "the perpetual fires that burned at Pagan shrines" are supposed to have been produced by this material ignited at the surface of some such natural source. The "perpetuity" of such fires may be easily comprehended when it is known that one petroleum spring[1] of historic mention has flowed continuously for over two thousand years. In later days the ignition of petroleum upon the ground or upon the surface of some pond or stream, upon which it was floating, seems to have been of frequent occurrence, and it is in connection with such ignition during the course of certain Indian ceremonies that mention of it is first made in American history. This was only about one hundred and thirty years ago, but we have evidence that petroleum was collected in pits or wells for some purpose at a much earlier date. These receptacles "which are known from the trees now growing upon the earth thrown out in making them or growing in the wells themselves, to be from five hundred to one thousand years old,[2]" are supposed to have been the work of that mysterious race known as the Mound Builders, but for what purposes the petroleum thus collected was used we can only conjecture.

Efforts to purify this crude material, however numerous they may have been, were not crowned with any measure of success until a very recent date; hence, when petroleum was accidentally obtained in drilling a salt well in Ohio in 1819, or ten years later under similar circumstances in Kentucky, not only was the immense value of the discovery overlooked, but the finding of the oil instead of

[1] In the Island of Zante. [2] Prof. Chandler.

the salt water which was desired was regarded as a great disappointment, the only use then known for petroleum being as a medicine, and the demand for it for that purpose being extremely small. Yet so close were they, even then, to a knowledge of the real importance of the substance that Dr. Hildreth, writing in 1826, said of it: "It is beginning to be in demand for lamps in workshops and manufactories. It affords a clear, brisk light when burned in this way, and will be a valuable article for lighting the future cities of Ohio." A third of a century, however, passed after the utterance of this prophecy before further progress was made; now, kerosene, the chief product of its subject, is to be found in every part of the world to which civilization has extended. Probably more than a million of the citizens of this state alone are entirely dependent upon it for lighting their homes, yet, as a recent writer has very truly said: "it is doubtful if there is another article under the sun that exerts as much influence in the civilized world; is so freely handled and so little understood, as kerosene."

Petroleum, sometimes called rock oil or coal oil, because an illuminating oil of similar properties was formerly obtained from certain kinds of stone or coal is, as has been said, one of the most abundant of natural productions. Formed in some not well understood manner in nature's great underground chemical laboratory, where, according to one of the most recent and most plausible theories, it is constantly being produced, it frequently rises to the surface of the ground either as an exudation or as a spring, from which considerable quantities may float out upon the surface of some stream or lake, or collect in low places or cavities upon the ground. Experiment, stimulated by the facts that illuminating oils were being profitably manufactured by the destructive distillation of certain kinds of bituminous coal, and that these oils bore a strong resemblance, before being purified, to the crude petroleum, finally showed that this material could be so refined as to make a satisfactory illuminant; a strong impetus was thus given to its collection at places where it appeared upon the surface, and large quantities were thence obtained by the clumsy process of absorption by blankets, which, when saturated, were wrung out into tubs or

Kerosene.

similar receptacles. The demand for it being an increasing one, Col. G. L. Drake, whose name is inseparably connected with the development of the petroleum industry, conceived the idea of sinking an Artesian well in the oil region for the purpose of obtaining oil; this project, which was regarded by his friends and neighbors as foolish or insane, was, nevertheless, carried into execution in 1859, the very first effort being entirely successful. Oil was struck at the depth of only seventy-one feet, and flowed at the rate of from four hundred to one thousand gallons per day, its value at that time being about sixty cents per gallon.

"From that moment the scene changes as if by magic." The declaration of the patriarch Job, that

'The rock poured me out rivers of oil,"

was literally verified, and an era of excitiment, scarcely equalled in its intensity, even in the search for gold, was at once inaugurated. "Hillside and valley are stripped of covering; log-house and shanty grow up over night; hand and machine are busy to tap the earth of its liquid treasure. A forest of derricks is seen where but yesterday was a forest of trees; all is working, drilling, pumping, collecting, shipping." The drill of Col. Drake's well, the first of its kind in the world, struck a vein of oil on the 28th of August, 1859. Before the year ended, more than two hundred oil wells had been sunk and were in operation. In twenty years from that date, more than twenty thousand such wells had been sunk and more than ten thousand were in operation in Pennsylvania alone.[1]

In 1860 the product of these wells was given at five hundred thousand barrels; in 1870 it had risen to over five million barrels, and the present yearly product is more than fifteen million barrels. Refined petroleum now ranks as the fourth in value of our export commodities, the oil exported during the last eighteen years being worth $562,992,645. How much in addition to this has been necessary for home consumption there is no means of knowing, but the amount required is estimated at nearly five millions of barrels

[1] These statistics are given on the authority of Prof. Schweitzer, of the *University of Missouri.*

annually. The average daily production in this country is now about seventy thousand barrels.[1] There seems practically no limit to the production of petroleum, for, while this enormous quantity has been procured in the United States, and chiefly in a limited region in Pennsylvania and New York, the product of other portions of the world is also immense and is constantly increasing as new fields open for its consumption and new uses are found for such of its constituents as are unfit for illuminating purposes. We are indeed appalled at the thought of the calamity which would befall the world should the production of petroleum fail in coming years, for, not only has it proven vastly superior as an illuminant to any of the materials which it has displaced but it is furnished at a price that is trifling as compared with that of any substitute as yet known or even thought of; the present prospect, however, is rather that of over-production and consequent cheapening than of any diminution and resulting increase in price.

CRUDE PETROLEUM

as obtained from its natural sources, is a substance differing considerably in character as obtained in different localities, and in all very different in appearance and qualities from the refined petroleum of commerce and home consumption. It is fitted for use by a process of distillation, the crude oil being placed in immense iron stills, which hold from a few hundred to 2,000 or 3,000 barrels; in these it is subjected to a carefully regulated degree of heat by which it is converted into a vapor which is afterwards collected and condensed into the liquid form, this liquid at different stages of the process being conducted into separate receivers at the pleasure of the refiner. The contents of these several receivers thus arbitra-

[1] During the year ending June 30, 1880, there were exported from the United States 423,691,767 gallons of petroleum products, valued at $36,221,066, of which 367,325,123 gallons, valued at $31,783,575, were classed as illuminating oils. These exports in the aggregate exceeded those for the year ending June 30, 1879, by more than 45,000,000 gallons, though owing to the cheapening of the product, they were valued at over $4,000,000 less in 1880 than in 1879.

rily separated, though differing widely in characteristics, are capable of intermixture to any extent and differ but little from each other in chemical composition, all of them being compounds of carbon and hydrogen in varying proportions. Chemists recognize a vast number of these substances as being present in petroleum, both in its crude and refined states, but very few of them are of sufficient general interest to demand consideration here.

A very moderate degree of heat in this refining process suffices to vaporize the lighter constituents of crude petroleum, the lightest of all, indeed, taking the form of vapor at ordinary atmospheric temperatures, while the vaporization of the heavier portions requires the application of a very great heat; and a small tarry residue remains at last which cannot be volatilized at all, and is found in the stills on the completion of the process. The earliest commercial products of this distillation are known as gasolene, benzine and naphthas of various grades, all of which are found in the markets and some of which will be more particularly mentioned hereafter.

The value of petroleum lies chiefly in that portion of it which, in the process of refining, gives the largest amount of its bulk in those constituents which constitute the refined petroleum of commerce and of domestic use popularly known as

KEROSENE,

a name first adopted as a trade mark for an illuminating oil manufactured from coal, limited quantities of which were in use before the discovery of the vast petroleum fields already mentioned.

Kerosene then is simply that portion of petroleum which comes from the still during the middle part of the refining process, excluding both the lighter, which are first distilled and too volatile to burn with safety, and the heavier portions which are not satisfactory illuminants, but make very good lubricators. In other words, it is the central part — the heart of the distillation, which is subsequently purified by washing with dilute acids, with alkalies and water. Just how large a proportion of the whole distillate shall be run into *the kerosene* tank is entirely within the control of the refiner, who

is governed in the matter not by any perceptible change in the appearance of his product, but by its specific gravity or weight, and, as kerosene is the one product of chief value in the whole process, it is plain that it is to the pecuniary advantage of the manufacturer to make the percentage of kerosene the largest possible.[1]

The refiner is, therefore, always under the strong temptation to allow a little of the naphtha at the one end of his distillation and a little of the heavier oils at the other end to run into his kerosene tank, neither of these additions being for the advantage of the consumer. In those establishments which refine thousands of barrels daily, the addition of a comparatively small percentage of these cheaper and inferior constituents will make an enormous addition to the profits, but such profit to the refiner, or to the dishonest dealer who may subsequently adulterate that which has left the refinery, is gained at the cost of those qualities which make kerosene a safe and desirable illuminant.

The fact that such adulteration can be accomplished without the possibility of detection by the consumer furnishes at once the reason and the demand for such authorized municipal or state inspection as shall protect the people from a fraud that affects not simply the cost of the article, but which also endangers inevitably the safety of life and property. Gradually the necessity for such inspection is coming to be generally understood, and state after state is being added to the list of those which have by legislation taken the wise and humane ground recently occupied by our own state, that traffic in this illuminating agent shall be subject to certain specified restrictions, and that all kerosene offered for sale must be able to pass certain specified tests. Progress in this direction has not, however, been made with sufficient rapidity, nor are the regulations as stringent as the importance of the subject de-

[1] NOTE.— Just here a hint may be given to those who desire the best article that can be had, that the very choicest oils in any given grade are those known as "Water White" which, so to speak, form the heart of the refining process and which, though somewhat more costly, are always the best illuminants; these oils are, as their name indicates, free from all color and as clear as water.

mands, it being still possible to sell in many states some of the lightest products of petroleum, such as gasolene and naphtha, for illuminating purposes; these are seldom offered, it is true, under their proper names, but with such deceptive titles as

NON-EXPLOSIVE BURNING FLUID,

Water Gas, *Centennial Illuminating Oil*, *Petrolene*, *Aurora Oil*, *Liquid Gas*, *Anchor Oil*, *Hyperion*, *Safety Gas*, *Sunlight Burning Fluid*, *Carbolite*, *Carbon Fluid*, *French Burning Oil*, *Septoline*, *Rose Oil*, etc., under some one of which delusive names, here one and there another, the unwary are entrapped into their use to their own destruction. It is usual in all these cases to add to the gasolene or naphtha, which forms almost the entire bulk of the fluid, some other article or articles which it is claimed improves it, and renders it "entirely safe in use." As a matter of fact, these additions are simply made for the purpose of deceiving; and the danger inseparable from any use of the chief constituent is in no degree diminished by the addition of any one, or all of them, singly or combined. All of these fluids are unsafe as illuminants, under any circumstances; all are explosive; tremendously so under certain conditions, which, it may be, occur rarely, but which may occur with any one and at any time. A very great danger, perhaps the most important one, lies in the immense inflammability of all these fluids. They will take fire at any ordinary temperature on the application of a flame, and many of them give off inflammable vapors with such rapidity that a flame need not be brought into actual contact with them at all, but will communicate itself to them very readily at the distance of several inches. The sellers of these death-dealing substances are in the habit of performing certain attractive but extremely delusive experiments to demonstrate their "safety," such, for instance, as removing the top of a lamp partially filled with one of them, and setting fire to the escaping vapor; pouring the fluid from a can through the flame so produced, thus showing, as they claim, and too often induce their *hearers to believe*, that "there can be no explosion!" No explo*sion is possible* under such circumstances, for explosions occur

only when the vapor of an oil becomes mixed with atmospheric air in certain definite proportions, in a confined space, as in the body of a lamp. If the fluid is so volatile that its vapor is given off with rapidity sufficient to *fill the lamp immediately*, and expel the atmospheric air, which is done in these experiments, the vapor simply burns quietly and harmlessly; if, however, a lamp in which such oil is burning should be accidentally broken, and its contents spilled, ignition is certain to follow and to spread instantaneously over the full extent of the surface of the fluid, bringing torture or death and destruction to all in its vicinity; from the nature of things, generally women and helpless children are the victims, and such results happen with all low test oils, in proportion to their volatility.[1] On the other hand, with a properly purified oil of high test, the chances of explosion are almost infinitely lessened; such an oil volatilizes and takes fire so slowly that, under similar circumstances, with ordinary presence of mind, nearly all chance of danger may be avoided, while an incipient conflagration can be at once arrested. This has been very thoroughly demonstrated in this state on several occasions within the writer's knowledge during the present year; lamps in which legal test oil was burning have been upset and broken, with no resulting injury greater than a soiled carpet, the physical certainty being that, had low test oils been used in these instances, conflagrations and loss of life would have occurred. With such happy results, the people of Wisconsin may well be congratulated upon the degree of safety secured by the inspection law of 1880.[2]

It is very true that all kerosene accidents cannot be attributed to

[1] The vapors, moreover, mingling under such circumstances with the air of the room, may, and often do form a true explosive mixture, to which, flame being communicated, are due the horrible concomitants often observed in connection with kerosene lamp explosions.

[2] The requirements of this law are, that no oil shall be sold or used that will emit an inflammable vapor at any temperature below that of 120 degrees, and that the oil must not thicken when exposed for ten minutes to a temperature twelve degrees below the freezing point; and that the character of all oils offered for sale in the state must be certified to by inspectors duly appointed by the state.

the inferiority of the oil used, and that accidents will undoubtedly happen with really good — such as in ordinary circumstances may be called safe — oils; still the great preponderance of such accidents where low grade oils are used is surely an ample justification of state inspection, and for prohibiting the sale and use of all oils below a certain grade, for, however strong the presumption that carelessness is the cause of any or every accident, we must remember that the world is likely to contain careless people for a long time yet to come, and that legislation will be long needed to protect them and their careful neighbors from the consequences of their acts; when they cease to exist, but not until then, will it be prudent to allow the general use of low test kerosene, or naphtha, or gasolene, without resorting to deceptive names to conceal their character; then also will it be safe to permit the unrestricted use and handling of gunpowder and nitro-glycerine, carelessness in the use of which is far less destructive, in the aggregate, of life and property than low-test kerosene which in the twelve years from 1866 to 1878 is estimated to have caused the death of thirty thousand persons, and destruction of property to the amount of twenty millions of dollars.[1] Such figures are startling, but we seldom appreciate the extent of injury done by occurrences that happen so unobtrusively — here and there a case which furnishes an item in the newspapers and is then forgotten.

The characteristics of good kerosene are so well described in a lecture delivered by Prof. Schweitzer, of the University of Missouri, that his account is here transcribed as follows:

"A good kerosene should be:

1. Safe, that is to say, not readily inflammable.
2. Odorless, i. e., not possessing a disagreeable odor.
3. Clean, i. e., not creeping over.
4. Pure, i. e., not encrusting the wick.
5. Light, i. e., not having too high a specific gravity.
6. Colorless.
7. Cheap."

[1] These figures are given on the authority of the *Petroleum World* and refer to the United States alone.

Kerosene.

Safety, it will be noticed, is here placed *first* in consideration; cheapness, very properly last.

Since the safety of an oil depends chiefly upon the test which it will bear, the question naturally arises, why not increase that test until a standard of absolute safety is secured? This can undoubtedly be done — that is, an oil can be secured of so high a test that it will not take fire more readily than the old-fashioned whale oil, remembered by many as the light of their younger days, and such oil in suitable lamps and with proper wicks can be made to burn satisfactorily; indeed, some of the most highly-esteemed oils are of very high test — those known as Mineral Seal and Mineral Sperm oils, for example, may be heated far above the boiling point of water, and will then put out a flame as readily and certainly as water will, and yet, when burned in suitable lamps, those having Argand burners and oil-reservoirs properly arranged, will give a brilliant white light of great purity and softness, and having very high illuminating powers. Says Prof. Kedzie, speaking of one of these: "It gives an excellent light for students — so soft, steady and so little fatiguing to the eyes, that I constantly use it in my study lamp." Such an oil is even safer in use than candles; its employment is compulsory on some steamboats. Other oils, that will bear tests much more severe than those required by our state law, are in common use and high esteem in some localities where a high degree of safety is specially desirable. But there is a limit beyond which it is not wise to go in legislation; such oils are more expensive, and require more than ordinary care in management; they are not well adapted, moreover, for burning in such lamps as are commonly found in our houses and markets, nearly all of which have burners fitted for the use of the more volatile and lower grades of oil — the same thing being true of the lamp-wicks, those usually to be purchased not being adapted to the use of a high grade, heavy oil. The function of the wick is to draw up the oil by means of capillary attraction to the top of the wick-tube, where it is to be burned; when the wick is capable of doing this duty, we shall have a good light even when we have a heavy oil; but if the wick be of too close a texture, as is very frequently the case, it fails to perform

its work, becomes dry and charred, and as a consequence the light grows dim and may go out. Thus, failure to adapt our lamps and wicks to the proper conditions often brings into disrepute an oil which, while being all that can reasonably be expected for safety, is at the same time capable, if rightly handled, of being made a most excellent illuminator. Time and a certain amount of practice are necessary to secure the best conditions, especially where a community has been long accustomed to the use of oils of very low grade.

From a lack of the knowledge above referred to, have doubtless arisen some complaints of the burning and illuminating qualities of the present Wisconsin legal test oil, but it is quite certain that such complaints will disappear upon the adoption of such changes in lamps, burners and wicks as are entirely practicable; the importance of this matter is such as to render excuse or apology for its full discussion unnecessary. The present "Wisconsin legal test" oil is simply an oil having a flash test of 120° Fah., which is equivalent to a fire test of about 160°, and such oils, or those of far higher test, can, as has already been shown, be burned with a very high degree of satisfaction, provided that the oil, the lamp, and the wick are properly adjusted to each other. Prior to the enactment of the existing law carefully conducted experiments were made with a large number of samples of kerosene obtained from all parts of the state; these investigations proved that a very large amount of oil fraudulently branded as having a test of from 110° to 150° Fah., but the real test of which was from 70° to 90°, or even lower, was being sold and used by our citizens without suspicion of the danger to which they were exposed and which will always exist in the absence of any law. Such oils will burn freely in almost any kind of lamp and with almost any sort of wick, no matter how closely woven and no matter how great the distance between the oil reservoir and the flame — indeed, so far as concerns safety, the greater such distance the better — with oils of greater specific gravity, the wick must be loosely woven and the oil reservoir should be broad and shallow; thus, the surface of the oil being always near the top of the wick tube, and the wick having sufficient capillary

force, we shall have a good, as well as a safe light; with any form of lamp and with any oil, the chimney and burner should be kept well cleaned and in good order generally.

As it is highly desirable to encourage the general introduction and use of kerosene of even higher grades than that recognized as the standard by the law of the state, and as the needful preparations for the use of such oils are not sufficiently understood, a few general suggestions are appended, which, if observed, will remove the objection which is likely to arise if the attempt be made to burn them without such preparation, to wit, that they are not satisfactory as illuminants:

1. Get the *best* oil, for there is a choice between oils, even of those which will bear the same legal tests. Thus, the "water white" oil of any special test is to be preferred to other oil of the same test, and this grade or quality of oil is especially desirable where the test is a very high one.

2. Use lamps with broad, flat reservoirs, so that the oil does not have to be lifted far to reach the place where it is to be burned — that is, to the top of the wick-tube.

3. Get good wicks — those of loosely-woven, open texture, with as few cross threads as practicable. See that the wick fits the wick-tube, but does not fill it so closely that it will not move up and down with perfect ease.

Most of the wicks, in the markets where low-test oils have been commonly sold, are of too close a texture for the satisfactory use of high-test oils. They answer perfectly well for the use of that which is very volatile, but fail to lift heavier oils to the place where they are to be burned. Such wicks may be improved somewhat by pulling out a few of the long threads, but should be abandoned for those of better make. A home-made wick, made of strands of old-fashioned candle wicking, sewn into a flat tube of coarse muslin, will be found to give excellent results with very heavy oils; though a wick thus made is liable to the objection that it will not move up and down in the wick-tube easily. The capillary power of any wick is destroyed by long use, and particularly by disuse, if left standing in oil.

Kerosene.

4. Keep the brass fittings of the lamp and especially the perforated plate which admits air to the flame, *clean* and free from all deposits of bits of charred wick, burnt matches, films of oil, etc., etc.; select also such burners as will allow the freest draught. Should the plate on which the chimney rests become bent or broken so that the chimney does not rest on it fairly and firmly, the draught may be interfered with or the currents changed, and it should be thrown away and a new burner be substituted. All parts of the burner should be perfect.

5. Get good, well-proportioned chimneys, rather long and narrow than otherwise. The short chimneys with heavy scalloped edge at their tops and which expand widely opposite the point where the flame comes, are especially objectionable.

6. Keep the chimney scrupulously clean; a smoked, dirty chimney, like a ground glass one, will absorb a large proportion of the light. Thus careful experiment has shown that while plain glass, one-sixteenth of an inch in thickness, will absorb about five per cent. of the light, ground glass of the same thickness will absorb over sixty per cent.

And finally, in the interest of safety in the use of kerosene oil of any grade:

7. Fill your lamps daily, and *never when lighted.* Do not fill a lamp by night or by an artificial light, if by any possibility you can avoid doing so.

8. Have all hanging lamps securely hung. All other lamps should have a good, large, heavy base, so that they may not be easily overturned.

9. Turn the wick down before extinguishing the light, but do not turn it far down and leave it burning.

10. Do not blow down the chimney to put a light out; if the wick is turned down, a puff across the top will do it certainly and safely.

11. NEVER USE KEROSENE OF ANY QUALITY FOR LIGHTING THE FIRE.

Extracts from Special Correspondence.

EXTRACTS
FROM
SPECIAL CORRESPONDENCE.

According to our usual custom, we present such extracts from the special correspondence of this office as appear to be of general interest. In the circular issued for the purpose of obtaining information respecting the general health of the people of the state, certain questions were asked to which specific answers were requested. In response thereto, communications from fifty-five correspondents were received, from many of which full quotations are presented herewith. Such quotations being made, however, there yet remained a large residue of information of value to the board and to the public also, but which could not be utilized in the same way, which has been furnished to us at the cost of, at least, the time of the writers, very often of no small value,— information which it seemed should be given to the people, both as containing knowledge important for them to have, and as a matter of courtesy to the gentlemen who have been at the trouble of forwarding it.

The circular above mentioned is given in full elsewhere in this report. In addition to the correspondents whose replies thereto are here given, communications have been received from the following gentlemen: J. E. Bacon, M. D., Waukesha; A. W. Bickford, M. D., Richland Centre; G. A. Bodenstab, M. D., Fountain City; F. W. Devoe, M. D., Wausau; W. H. Earle, M. D. Wrightstown; L. Eidemiller, M. D., New Cassel; E. Ellis, M. D., Ashland; D. R. Freeman, M. D., Colfax; C. A. Guenther, M. D., Franklin; R. E. Glover, M. D., Bell Centre; C. B. Marshall, M. D, Osceola Mills; J. Massman, M. D., New Holstein; J. Oettiker, M. D., Georgetown; W. H. Oviatt, M. D., Clintonville; H. H. Parrott, M. D.,

Extracts from Special Correspondence..

Douglas Centre; J. F. Pritchard, M. D., Manitowoc; D. W. Rector, M. D., East Troy, and D. A. Spencer, M. D., Augusta. It is believed that in this list are embraced all names of correspondents from whom communications have been received in addition to those from which quotations are hereinafter made.

It is the decided opinion of the majority of those who have considered the matter, that there is no ground whatever for any fear that change of climatic conditions in Wisconsin either has produced, or will produce, any marked increase in either pulmonary or malarial diseases; while several of our best and most careful observers admit that consumption has increased to some extent within our boundaries within the past few years, the reasons they assign for such increase, substantially the same as those given by Dr. H. F. Godfrey, in the thoughtful communication quoted at length in the secretary's report, are of a character to relieve our citizens from the apprehension upon this score which many have felt and have expressed. The majority of our correspondents also give it as their opinion that the aggregate amount of sickness in the state is not increasing from year to year, some thinking that it is diminishing, while none think that there is an increase in disease proportionate to the increasing numbers of our population. Quite a number of writers reply to the first, second, fourth and fifth questions proposed in the circular in the negative, adding frequently qualifications, which, however, are not of a character to disturb confidence in the general reputation of Wisconsin as an exceedingly healthful place for permanent residence.

The following are the more important parts of the communications for which, and for the kindly and continued interest shown in our work, we return our sincere thanks.

As hitherto, the extracts are arranged, for greater convenience of reference, in alphabetical order according to the towns from which they come.

Alma.— Dr. G. Seiler writes from this town as follows: There was a somewhat severe epidemic of Diphtheria in this county last *fall with a* pretty high death rate — forty or fifty per cent. Foun*tain City is a* healthy place; the streets are kept clean and the

water is excellent, coming mostly from springs, but yet the severity of the disease there was remarkable. In one house where three fatal cases occurred the well was in the cellar — a very bad location.

One case occurred which shows in a pretty strong light the contagious character of the disease: a boy living in a locality where no case of Diphtheria had been observed for three years, began attending the public school; fourteen days thereafter he contracted Diphtheria which assumed a malignant type, and, in spite of the most energetic treatment, he died in three days. His brother, who went to school with him, was also attacked, but the malady in this instance was milder in type and he recovered. Isolation and disinfection of houses, the school house in particular, was practiced to a considerable extent, and when the disease had apparently reached its climax, it suddenly ceased and no further cases occurred.

Belmont. — Dr. B. M. Gill sends the following interesting information: An instructive case of arsenical poisoning occurred here some little time ago. I was called to see a child of three years old, who was vomiting and showing other signs of gastric disturbance; supposing at first that his condition was caused by some improper article of food which he had taken, I treated him upon that hypothesis, but without success. The next day, the gastric difficulty still continuing, although the purging had ceased, I inquired whether the child could by any possibility have had to do with any corrosive substance, or eaten anything poisonous in character. At first such an occurrence was pronounced wholly out of the question, but after much consideration the servant girl remembered that he had washed his face and hands with a piece of green silk, and that a large part of the dye had come off in the operation, leaving him well covered with it. On seeing the silk, which at my request was found and brought to me for inspection, I decided that I had discovered the cause of the sickness, and accordingly changed my treatment with satisfactory results. The next day the eyes were puffy, and the stomach continued irritable for some days thereafter, but the boy finally recovered.

Analysis showed the presence of both copper and arsenic in the

Extracts from Special Correspondence.

silk (Scheele's green). I do not think that the poison had been absorbed through the skin, but rather that the child must have swallowed some of it during his washing operations; I should be glad, however, to have the opinion of others on this point.

Whooping Cough and Diphtheria have both appeared in this neighborhood, but careful seclusion has been enforced in every case of either disease, and therefore they have not spread.

Farmers hereabouts have sold to buyers hogs dead from hog cholera, which were shipped to Chicago in the same cars with living, and presumptively healthy, animals. This is undoubtedly a very bad arrangement, and if there be no law already to control it, one should pass very speedily.

Boscobel. — Dr. L. G. Armstrong reports thus: It does seem to me that there are more cases of Phthisis among our people now than there were twenty, or even ten years ago. Certainly the number is very large, and they occur principally among the laboring and middle classes of our population. I am unable to assign any definite cause, but think it may originate in depression of system from malarial disease, never properly *cured* as such.

Last season every one who was sick had chills, but this season chills are not fashionable, while Bilious Fevers, Diarrhœas, Dysenteries and the like are common. We have had no epidemic disease among children for the past two years in this immediate vicinity, but about twelve miles from here Whooping Cough and infantile diarrhœas are quite prevalent.

The Wisconsin was very high early in the summer, and every one predicted a plentiful crop of chills and fever — which had not been produced hitherto.

Brillion. — Dr. I. McComb sends the following brief report: Diphtheria and Typhoid Fever have been more frequent and severe in their occurrence than usual. In my opinion this is due to filth in the surroundings, and the bad sanitary habits of many of the families affected.

Calumet Harbor. — Dr. J. B. Devlin, writing from here, says: Diphtheria was brought here from Fond du Lac by a family living in that city who, having lost two children by the malady, sent the

Extracts from Special Correspondence.

remainder here; two of these developed the disease shortly after their arrival. Measles also has been rife, introduced from the same locality.

Colfax. — Dr. E. Monteith sends the following instructive statement: Typhoid fever was very prevalent here last winter, some cases being quite malignant. The first of this character appeared in a family where the drinking water was procured from a creek or from a hole dug by the edge of a marsh and called a well. *Nearly every family living on the creek below the point at which this first case occurred had one or more cases of Typhoid Fever*, while those living higher up, or away from the creek, had no trouble. At another place, distant about three miles, lived a family, four of whose members were taken down within three days. Here also the drinking water was taken from a creek where, on examination, I found a rough bridge of poles and brush thrown across, above which the surface of the water was covered with a thick, green, offensive-looking scum. From these cases several other families were infected, but I saw no instance of fever where the drinking water used was good and pure.

Much new land is broken up here every year, and I think that much ill health is due to that fact; still, if more attention were paid to the matter of securing good and pure drinking water and to personal cleanliness, this would be a very healthy section of the state.

Eagle.— Dr. C. B. Bannister reports briefly to the following effect: We have had no epidemic other than a very light visitation of Measles. Most cases of disease of a malarial type that I have seen have been caused by stagnant, putrid water in old cisterns under the houses or by damp cellars not properly cleaned and having walls neither plastered or painted as they should be.

Fond du Lac.— L. R. Lewis, health officer of this city, says: There have been many cases of Diphtheria, the majority of which I attribute to a lack of cleanliness and improper ways of living.

Freedom.— Dr. E. Erb reports from here to the following effect: There has been no increase in pulmonary disease or in any type of malarial trouble, but rather a marked decrease of sickness gen-

erally, and what few cases do occur are very mild in character. After an epidemic of Scarlet Fever last year, which took on at first a quite virulent form, beginning in the southwestern part of the town and moving along the lines of the main thoroughfares, ceasing with the approach of winter and taking a new start in the spring, but in much milder form, there was a general decrease of zymotic disease. In some few cases of Scarlatina during the season above mentioned there were unusual sequela, but otherwise there was nothing worthy of special notice.

Geneva.— Dr. B. O. Reynolds gives this generally favorable account of this place: Diphtheria, our scourge of last summer, still makes its appearance in isolated families in our village and the surrounding country, but not as last season, in an epidemic form. A few families have been attacked this year that escaped last, and I know of no severe cases occurring this season among those who suffered last summer. Twenty or twenty-five cases, perhaps, all told, will cover all that we have had during the past six months; many were severe and a few fatal. No especial cause has as yet been found to account satisfactorily for its outbreak in any family here.

A few cases of malarial trouble have occurred among the residents of that part of the village bordering on the mill-pond, but I have heard of little, if any, Diphtheria showing itself in that neighborhood. In all other respects we have enjoyed our usual measure of good health.

Hammond. — Dr. E. L. Boothby writes to the following effect: We have had many cases of Diphtheria scattered around in different places. Isolation was insisted upon as far as possible, and no single case has occurred that could be traced to contagion. The houses where the disease occurred were from one to six miles apart and there was no communication between the families who occupied them; I therefore believe the causes to have been entirely local.

Pretty much every house in town has been disinfected and our people's eyes are opened to the fact that *they can stamp out the disease if they try.*

Hazel Green. — Dr. J. L. Jenckes gives the following account:

Extracts from Special Correspondence.

Early in April last a man and his wife called at my office and desired me to examine a little child for what they supposed to be some sort of eruption which was then just breaking out upon it. I at once recognized the disease as *Small-Pox*, many of the pustules being fully developed on the face, scalp and limbs. The parents informed me that they had two other children at home suffering from the same disease, none of them having been vaccinated; the father also was just recovering from an attack of Varioloid from which he had been quite ill.

He supposed that he had contracted the disease from a German immigrant family whom he had met some weeks previously in Illinois. He and his family occupied an isolated dwelling some five miles from the village in the northern part of the township; all of them were ordered to confine themselves strictly to the house, which direction was enforced, and no neighbors were allowed to enter, all living in the vicinity were or have been vaccinated, and by these means the disease was confined to the original three or four cases.

Leeds. — From this town Dr. J. Faerber sends this valuable communication: I have observed an increase in cases of Phthisis, but am somewhat at a loss to assign any cause therefor. Our town is an old settled one, few families come into it and our population changes very slowly. I note the development of pulmonary disease mainly among our younger people, and the only hypothesis I can frame is that the conditions prevalent here, atmospheric, climatic, etc., are not so well borne by the children as they were by the parents who came here years ago and went through all the hardships of pioneer life. So far as any change in habits of life has taken place it has been for the better; the sanitary conditions are certainly improved and improving, and better homes and better surroundings generally are found. It may be that the clearing off of all our woods and the consequent loss of any wind-breaks, the exposure of our high, undulating prairie surface to the strong winds which sweep over it in winter, unchecked and untempered at the present time by any forest-land, is to be taken into consideration; but yet one effect of this clearance has certainly been to render the

country much drier than it was formerly, and I believe that it is now pretty well settled that the drier a soil the more favorable is a location in phthisical difficulties.

We have had epidemics of Measles and Parotidis, which were very obscure in their origin, but were finally traced beyond all doubt to a single district school, by means of which both diseases were very widely distributed. This was proven by the fact that at first each disease was limited to the children attendant upon a given school; e. g., Measles appeared in a certain district and ran its course without affecting the children belonging to a second adjacent district where Mumps was prevalent at the time, the children of the first district remaining, meanwhile, free from that disorder. After a time, however, probably by the transference of scholars from one district to the other, certainly by communication in some way or other between the two, the diseases overlapped, and both appeared in each district. Neither of them was very severe in any locality, and apart from the means of their spread and the method of communication, no interest whatever attached to either of them.

Linden.— Dr. B. W. Gill makes these suggestions, which are worthy of careful consideration; I should be glad to call attention freshly to some points of interest in regard to milk; points which have been suggested to me by my own personal observation, and which I fear have not received the consideration which is due to them. Now that there is so much importance attached to all questions of food and drink, I think it well to have this of milk supply fully discussed, as whenever this is done, the risk of sinning through ignorance becomes less thereafter. We are told to be careful in our selection of milk for children, but it seems to me that a most important direction in which care should be exercised has not been pointed out. Of course we are told that the cows must be milked regularly, the milk received in vessels scrupulously clean and afterward properly cared for and prepared; but this, it seems to me, is not beginning far enough back.

I do not believe that an unexceptionable supply of milk can be obtained from cows that are allowed to run at large, either upon the public highway or in ordinary pastures, and my reasons are as fol-

Extracts from Special Correspondence.

lows: Cows may overeat themselves, either when pasturage is rank and abundant or by breaking into grain or other fields — a thing of frequent occurrence even upon the best regulated dairy farms; they may consume noxious weeds from which very undesirable qualities may be imparted to their milk; they may drink from impure sources and thus introduce Typhoid or other similar germs into their own systems directly and into human systems indirectly; they may inhale poisonous effluvia from dead and decaying animal or vegetable matter; they may and do sometimes become overheated from various causes, especially during the breeding season. All these possibilities, probabilities rather, with others that might be mentioned, seem certainly worthy of consideration; I am satisfied for my own part that I have seen children repeatedly who have been rendered sick by the use of milk that from one or more of such causes as those above enumerated was unwholesome.

I should, therefore, suggest that the cows from which milk for household use is taken, and more especially milk intended for a child's nourishment, should be kept in clean, dry, well ventilated, well lighted and well warmed stables, and fed upon a good allowance of timothy and clover hay, with cooked meal and bran, furnished with water of known purity, and let out only to get such exercise as is needful to keep them in high health; and I believe that thus their milk will attain a higher purity and a better quality than is possible under the ordinary management.

I have no doubt that the secretion of milk also serves some excretory purpose in the animal's economy, one evidence of the fact being the rapidity with which onions, carrion, any strongly odorous substance, in short, affects the fluid. I know that many babes have been successfully reared on cows' milk, but I know also that many others have suffered and died under attempts to rear them in the same way, and I believe that a large proportion of this suffering and death may be avoided by the general adoption of the measures above described and advocated.

Lodi.— Dr. G. E. McKeeby reports from here as follows: Diphtheria has prevailed hereabouts more or less during the past year, and for the most part in families occupying small dwellings, and

living and sleeping on the ground floors. The mortality has not been great, and few cases only have been of malignant type; those that have proved fatal have generally been instances in which some complication has occurred. Contagion has not been the rule in the spread of the disease over this part of the state; isolated cases have occurred simultaneously in different parts of the same village or neighborhood. The march of the malady has been from south to north.

Lomira.— Dr. H. P. Wenzel writes from here to the following effect: Last winter we had a sharp outbreak of lung troubles, quite serious in character, but with careful management few died. I consider this to have been due to the inclement weather and to needless exposure thereto, and hence I regard it as having been, in part at least, avoidable. We had also an epidemic of Typhoid with a mortality of seventeen per cent. Concerning the origin and means of propagation of this disease, I am in great doubt; it appeared in the most tidy houses, and where the surroundings were quite unexceptionable, as well as in those where the cellars were fetid, the garrets odorous and the yards smelled rank to heaven; in places between which there was no direct communication, nor any indirectly that I could trace. Pettenkofer's theory would explain, it however; *i. e.*, ground-water high, and great moisture = little disease; ground-water low, with little or no moisture = virulence in disease. I have no doubt for my own part that the ground-water is a factor in producing results.

I have noted for the past three years that where limestone ledges crop out near the surface, we have had more sickness than in localities where it recedes to a considerable distance below. I do not pretend to explain the fact, but there it is, awaiting an explanation. It may be added that many of our wells, being sunk in the limestone, act as reservoirs for the sipage water which percolates through the thin layer of soil overlying rock, collecting organic matter in its passage, and that mixture of this water with the harder water from below favors chemical changes and decomposition. We have also had an epidemic of Measles of mild type, and many cases of Scarlatina which proved almost uniformly fatal, cerebral

Extracts from Special Correspondence.

complications occurring in every case. *Both Measles and Scarlatina disappeared as soon as rigid quarantine was established and isolation and non-communication enforced.*

I again call attention to the condition of our rivers; they should be protected by law from pollution, not only for the sake of the fish, though they deserve consideration, but on account of the health of the animals who drink from them, and for the sake of safety to ourselves who must consume the milk and meat furnished by the animals.

Madison.— Dr. W. Hobbins gives us this information: We had many cases of Scarlet Fever during the months of March, April and May, at which time the disease was so fatal that I was consulted by the board of education upon the propriety of closing the schools of the first ward for a season. I took the matter into careful consideration and finally decided that such a procedure was unnecessary, but I took the precaution of having that part of the city very thoroughly cleaned up. I found upon a block on which a school building stands, and three others adjoining it, no less than one hundred pigs, all of which I had removed. The school house itself was in a terribly dirty condition, and I caused it also to be thoroughly cleansed, after which other wards received attention. Vaults full of filth were discovered, cleaned out and disinfected. The good results of all this work were immediately perceptible; although the disease did not immediately disappear, and we had many cases after the cleaning was done, its type was entirely changed and the marked fatality ceased.

Mauston.— Dr. J. J. Herrick furnishes the following facts: There has been no special increase in Phthisis or other pulmonary disease hereabouts, but a very decided addition to the number of cases of malarial origin, both in my own practice and in that of other physicians, especially within the past sixteen months. Atmospheric conditions have varied more rapidly, and to a greater extent, in this neighborhood, than has been the case heretofore. As to the degree of soil moisture, I am unable to form any opinion. Your inquiries, however, have started me upon a new line of thought and investigation as to the causation of disease, which I shall *follow up, I hope*, with profit in the future.

Extracts from Special Correspondence.

There has been no notable change in the habits or modes of life of our people, nor has there been any marked increase in our immigrant population. I am of the opinion that there has been a decrease in the number of cases of disease having a zymotic origin, during the last twelve months. There were a few cases of Diphtheria last winter, but happily none were very severe. In each family that the disease visited it showed itself first in a child who had attended the public school. The school house was badly ventilated, not uniformly or properly warmed, and was over-crowded. The one fatal case occurred in a family living in a house where the privy was attached to a wing, its drain running near to the well and close to the surface.

Dr. H. J. Stalker, from the same place, corroborates the above statement concerning malarial disease, saying: There has been a marked increase in malarial disorders here during the past summer and autumn — some say greater than there has been for twenty years. The cause was probably the high water in June last in the Wisconsin and other streams; during the early part of the summer not only the soil but the atmosphere was saturated with moisture.

Medford.— Dr. S. B. Hubbell of this town says: We have had a large amount of Typhoid Fever here, caused, I think, by the following state of things: In June last there occurred a great rise of all the creeks and streams in Taylor county, flooding the whole country and leaving, when the water subsided, a large amount of vegetable and swamp refuse distributed along the banks and bottom lands. Later on in the season we had much rain and warm, cloudy weather, causing wheat to rust and root crops to rot in the ground. I observed that a majority of the cases occurred in families living on the borders of bottom lands or adjacent to swamps, where much of the material above referred to was left by the water and decayed during the warm damp weather which succeeded the flood. In no case did I discover defective sewerage, foul water, or any of the usual causes of Typhoid in rural communities. There was also considerable disease of malarial type.

Monroe.— Dr. F. W. Byers gives the following opinion: Pulmonary diseases have increased decidedly in number, while those

Extracts from Special Correspondence.

of a malarial type have not. Immigrants from Norway, more especially, seem to bring with them the germs of Phthisis, and badly ventilated dwellings and unsanitary habits do their part in developing it.

Neenah. — Dr. J. B. Barnett furnishes this very explicit and valuable communication: There has been very much in the course and character of disease hereabouts during the past year to attract the attention both of professional and non-professional men. First in order and frequency of occurrence, and notable as one of the most important of our local diseases, stands Typhoid Fever. For many years it has been questioned whether real Typhoid has been known here at all, but as early as the middle of September, '79, there were many cases that were unmistakable, and within a month thereafter, I think cases of Typhoid outnumbered all other cases of serious disease; without showing any great fatality, it was remarkably persistent in its visitations of some families, not leaving them until the greater part of their members of susceptible age had, one after another, given up to the infection, the number in one particular family reaching six. From a sanitary point of view, this instance was of great interest, affording almost unmistakable evidence of filth origin. Upon an inspection of the premises, I found the well and the privy very near, and probably very *intimate* neighbors, being only eight yards apart, while the character of the soil was such — a sandy loam upon a clay substratum — that there was no obstacle whatever in the way of a free filtration and interchange of contents. I could learn in this case of no evidence whatever of specific infection, for no Typhoid case had existed in the neighborhood to contaminate the well or the vault with specific germs, and yet the character of the disease was easily identified, for all the distinctive clinical phenomena were present.

In another case some miles distant, I satisfied myself that contaminated water supply was the cause. The privy was fifty feet away from the well, but situated upon a loose gravelly soil, only two or three feet deep, and having below it a limestone stratum which dipped sharply toward the well. In this family only one case occurred, though there were several members of susceptible age, for

Extracts from Special Correspondence.

the household was wise enough to abandon entirely the use of the well as a source of water supply; had the first family been equally prudent, its members would probably have had an equally happy escape.

Early in the period during which Typhoid was rife, a tendency to Pneumonia was developed, and this was the commencement of an epidemic of that malady which was distinguished by its fatality above all that have preceded it. It also had a sanitary interest from the fact that it afforded evidence of contagiousness in an unusual degree. In a number of families it attacked several members in succession, exhibiting a period of incubation of from five to ten days. Two families lost three members each, their ages ranging from fifteen to fifty. In both these families and in two others where this seeming contagiousness occurred, the disease was complicated by serous inflammation.

In these cases it was hard to identify the exciting causes, but it is fair to conclude that unsanitary surroundings and conditions were at least co-operating causes. The families lived near each other, the houses were built upon low, wet ground, were over-crowded, without ventilation, and unwholesome generally, and their inmates were under-fed and ill-nourished. Certainly the cause, whatever it may have been, was confined to that particular locality in the town, showing that it was probably something distinct from the conditions existing elsewhere, though unsanitary conditions were by no means confined to this quarter.

Diphtheria, in various degrees of severity, seems to have estab lished itself permanently here. Scarcely a week has passed without its quota of cases, and during the spring the number was alarmingly large. The proportionate mortality, however, has not been large, excepting in the months of March and April. Always keeping in mind the question of filth causation, I carefully examined every case coming under my care for possible causes of this nature, but must admit that my results have been negative. Frequently many unwholesome conditions were found associated with my cases, and these seemed to bear a relation to *fatality*, but otherwise the *disease was* impartial in its visitations. No part of the town has

been exempt, and in no one quarter has it predominated more than in any other.

New London.— Dr. L. Grasmuck sends this melancholy history of occurrences near this place; I wrote you some time ago in regard to the prevalence of diphtheria in a neighboring town, where a school had been twice disbanded on account of the disease, it having become quite evident that the school was a most efficient agent in disseminating the malady. Lately, in despite of advice and defiance of warning, this school has been reopened, no efficient disinfection having been practiced previously. As a result of this proceeding, diphtheria has again made its appearance in two or three families whose children attended the school, several cases having already proved fatal. Nor is this all. A young lady living in an adjacent town caught the disease while on a visit to the town in which the school is located, and carried it home with her, communicating it on the way to a friend whom she met and kissed. After she had reached her home, the younger members of her family caught the disorder from her, and, in their turn, carried it to school, where it spread to their school-mates and thence through the second town.

New Richmond.— The following valuable paper is from Dr. O. N. Murdock: I have a report to make that is instructive in itself and interesting, as bearing upon and adding one more testimony to a point of vital importance. There has been an outbreak of diphtheria here, limited in extent, fortunately, that in my opinion had its origin in bad drinking water. Two young men, aged respectively sixteen and eighteen years, were working on a farm a few miles distant from town, and using water from a well located in a barnyard, the water being so foul that the older people refused to drink it at all. These two lads, however, either through recklessness or ignorance, perhaps from a feeling of foolish bravado also, drank of it freely, quenching their thirst only from this particular well. They worked on Friday and Saturday, and went home to spend the Sunday; on Monday morning both complained of headache and general malaise, and nausea and vomiting soon followed; in the evening of that same day they began to complain

of sore throats, and on Tuesday morning the cervical glands were enlarged and indurated, and the tonsils covered by the characteristic membrane. During that day and the next, the false membrane extended its borders, covering the posterior wall of the pharynx, the palate and palatal arches, causing suffocation and death in one case on the morning of the fourth day. The other case held out a little longer; the membrane, thick and leathery, would be thrown off and again form, the fever continued, and thus matters went on, till finally the reception of nourishment became impossible, the vital powers gradually failed, and death followed.

At the first house, great care was exercised in disinfection and fumigation, and no further case of the disease appeared. At the second, where no care was taken and cautions were unheeded, six cases followed, none of which, however, had the virulence and malignancy of the first. I may add that the family living upon the farm where the well above spoken of is situated do not use the water from it at all, but draw their supplies from a cistern provided with a proper filter. I have reported the case thus minutely, that there may be no doubt of its character.

Oconto.— Dr. D. P. Moriarty, writing from this town, reports a very satisfactory condition of health generally among its inhabitants, and adds: The increased and increasing use of water from artesian wells for drinking purposes seems to have done away, in a very large measure, with typhoid fever, dysentery and kindred diseases formerly so common here among us.

Dr. H. Allen, in a communication from the same place, describes a locality which furnishes an exception to the general good health of the town: We have had many cases of typhoid, which I attribute to the water used at the boarding house of the Oconto Lumber Company. On examination, I found the well situated in the middle of a large stable occupied by sixty or seventy horses; the water had a very bad taste and odor. About June 1st, ult., the greater part of this city was submerged, and the contents of all the privy vaults were distributed impartially over the town. There being no efficient system of drainage, the water remained stagnant *in pools* here and there for weeks thereafter, causing a most

Extracts from Special Correspondence.

abominable stench; this state of things contributed in no small degree, in my opinion, to the unusually large amount of sickness we are having this fall.

We have had one case of Small-pox here — a very severe one. It is almost certain that the disease was contracted on a railway train somewhere between here and New Brunswick. Every precaution was taken to prevent its spread, and, I am happy to say, with success.

Oshkosh.— Dr. G. M. Steele makes this contribution from this city: I am inclined to think that there has been an increase in the number of cases of Phthisis, of late. That there has been such an increase in the number of cases of Pneumonia and of bronchial difficulties, in this vicinity, there can be no doubt. Perhaps the greater prevalence of these less severe pulmonary affections may explain the increase in Phthisis; they certainly may act as exciting causes where there is any predisposition to tuberculosis, hereditary or acquired. I can recall one case, at least, in which this was very clear.

Malarial diseases have not been more frequent than usual during the past year. At one household, some eight cases of malarial fever sprang up quite nearly together, the cause of which we were able to find in the drinking water used. Foul drains in close proximity to the well caused the contamination, though the well was quite deep. An examination of the water resulted in showing the presence of organic matter in considerable quantity. During the early part of the season, Diphtheria raged here in a malignant form, but for some months, now, there have been but few deaths from this disease, in this vicinity. My observations have led me to exercise more and more care in isolating the sick in cases of Diphtheria; two or three years ago, I thought it much less contagious than I hold it to be now.

The total amount of sickness hereabouts has not been above the average for the past year, I think; still this is only an opinion founded upon my personal observation, and might be greatly modified if we had here an efficient local health board, doing good work in the way of accurate statistical records, which organization at present we *lack*.

Extracts from Special Correspondence.

Oxford.— Dr. A. G. Stoddard reports from here as follows: The only unusual event of the year was the occurrence of Pneumonia during the late winter and early spring months to an extent which heretofore was unheard of. I have questioned old residents who have known this district for thirty years and more, and not one of them can remember a visitation which affected so large a number of persons. The winter was characterized by sudden and extreme fluctuations of temperature, with a high degree of humidity. The majority of those attacked were of the poorer classes, many of whom lacked sufficient clothing, especially of the feet. The death rate was low, and the disease uncomplicated.

Racine.— Dr. J. G. Meachem sends the following suggestions which will apply to other latitudes than that concerning which they were made: It would seem that if we were to act with ordinary common sense only in regard to personal care and responsibilities, we could easily have that perfect hygiene which we are now trying to obtain. The fact is, that many diseases and much ill health arise from our own negligence or carelessness, and so far, at any rate, we are our own destroyers.

If we look at the various places of filth to be found in our yards, streets, alleys, vacant lots, etc., we can but be aware that their presence is due to some lack of care in personal responsibility. An accumulation of filth is but a small matter in itself, but if it be allowed to remain through heat and rain, which aid decomposition and transform it to a heap of rottenness, giving off mephitic vapors, to poison the air we breathe, and a solution of nastiness to saturate the soil on which we live, and to contaminate the water we drink, it then becomes a very different matter and one that affects every citizen. No individual has any right morally, whatever he may think his legal rights are, to maintain a filth nuisance which shall in any way compromise or endanger his own health or that of his family or his neighbor. Far less has a city the right to allow any local or preventable cause of ill health to its people to remain unabated.

There are numerous instances on every hand in which individual care and responsibility can avail much in preventing sickness and death. There are also matters which it is the province of the city

Extracts from Special Correspondence.

as a municipal corporation to regulate. Two of these last named demand special attention at this present time, i. e., a general system of scavenging, especially of privy vaults, and the water supply. The rapidly increasing necessity for both for the future maintenance of health among our people will soon demand that attention be given to them. Pure air and wholesome water are needful for the preservation of good health. If, however, anyone walks up and down any one of our streets on a warm humid evening, he cannot fail to notice the odor which rises from the accumulations in the vaults. Such air is poison to everyone who inhales it; this is a condition that can be and should be changed. A system of earth closets, with regular scavenging can be maintained at a very moderate cost, and with great advantage to the health of our people.

Reedsburg.— Dr. C. A. Rood gives this very suggestive and instructive account: I have had two cases of Scarlatina in one family; one malignant and fatal, both originating, as was supposed, through the agency of a hired girl. Only five or six days before coming into the family of my patients, this girl had been living in a house where there had been Scarlatina, but she claimed that she had taken every precaution in the way of bathing, etc., and asserted that the clothes which she wore had not been in the infected house at all, every one of which assertions may have been true. She allowed the children in the second house, however, to play with her in various familiar ways, particularly to comb her hair, which probably contained the germs of the disease. For months previously, there had been no Scarlatina nearer than nine miles to these children, to my knowledge.

We have had some Measles, a distinguishing feature of which was the great length of the incubating stage; in nearly or quite every case which came under my care, or which I could hear of, three weeks was the shortest time, and from that on to five and six weeks, elapsed between the time of contracting the disease and the appearance of its characteristic symptoms.

River Falls.— Dr. S. M. Davis narrates the following history: There has been no epidemic during the past year, either here or within two miles of this village. There have been many sporadic

Extracts from Special Correspondence.

cases of Typhoid Fever and Diphtheria of malignant type, traceable to filthy surroundings, and filth in the water supply, of which the following are illustrations:

In a family numbering eight persons, Typhoid made its appearance in July, and by the 1st of September every member had suffered from it, one case proving fatal. The house in this case stood on the brink of a hill on a clay subsoil; sixty feet distant and up a gentle slope was the cow stable and piggery, whence every rainstorm washed filth down to and around the house. The well was fifteen feet below the house, was twelve feet deep and had a goose pond close by; the water therefrom being examined, showed decided evidence of contamination by animal filth.

In another family of seven members, composed of father, mother and five children, whose ages ranged from two to eleven years, Diphtheria made its appearance, the first case proving fatal within twenty-four hours. The second day of the outbreak, one child being already dead and all the others sick, I was called in; I found a state of things almost baffling description. The doors and windows were all closed, and upon the stove which heated the room, the only apartment in the house, were two kettles and a pot of water. A cask or barrel half filled with swill stood close to the stove, and the condition of the inmates may be imagined, especially when I add that the house was wholly without drainage and was built upon a damp clay soil. As soon as practicable I had a better sanitary state of things brought about, and the children who were last attacked all recovered. I am convinced that a chief factor in aggravating Diphtheria is filth, and confinement in damp, ill ventilated apartments is also a very effective agent in developing the disease when its germs have once obtained a lodgment.

Rosendale. — Dr. S. Hall has done a good piece of work in this place of which he gives the following modest account: Will not others who are qualified "go and do likewise?" The organization, if such it can be called, of the board of health in this town is very carelessly effected, and the appointment of a health officer is a mere device for the purpose of shuffling off the responsibility of making a report. It is quite true that our population, being a farming one

Extracts from Special Correspondence.

generally, and therefore quite widely scattered, there does not *seem* to be the same need for the active intervention of a local board that exists in some of our larger and more compact villages and cities; nevertheless, even here, there should be a full and effective organization of such a board, for no one can tell at what moment Diphtheria or some kindred malady may come into our midst and require such prompt and energetic measures as can be effectively taken only by the agency of such a body.

I made a brief address last winter before the Farmers' Club of this place, on hygiene, which subject was before the club for discussion. The most prominent idea in my mind at the time was that of the dissemination of disease by contagion. I instanced especially a case in which some emigrants left a district in Germany where Cholera was prevalent; there were no cases of the disease in the port from which they sailed, none of the party were suffering from it, nor did any case appear on ship-board during the passage. In a word, no trouble at all choleraic in character manifested itself until after the arrival of the whole party in Dakota, where they settled; then and there, however, circumstances favored the development of the disease, and, when their household goods were unpacked, it broke out, showing itself first among those who had done the unpacking and who made use of the articles, and spreading from them through the whole community. This case showed that the virus of Cholera, like that of so many other zymotic disorders, may be boxed up with textile fabrics and transported over long distances, remaining dormant the while, until circumstances favor, and susceptible subjects are found.

From this I passed on to the consideration of the virus of other diseases, particularizing Small-pox, Scarlet Fever and Diphtheria, the two last of which are unfortunately only too well known among us, and thence went on to consider the dissemination of disease by the agency of polluted water, speaking especially of wells and similar sources of supply and of their undue proximity to cess-pools, privies, drains, etc., and ending with a discussion of house ventilation and the means of introducing pure air. A good deal of ground was covered in the course of the talk, though, as I am well aware,

in a very off-hand way, as the whole was delivered extemporaneously, and with scant time for preparation.

I have found much ignorance concerning all these matters among the people, but I have also found a strong desire to obtain trustworthy information about them, and I think that physicians generally might gain honor for themselves, and do much good by spending a little time occasionally in this work of extending popular knowledge. I fear that as a class we have not set these things before the people as much as is our duty, and I for one shall be glad to avail myself of any opportunity that may offer for so doing, whether by remarks, even though they may be crude, or by distributing documents prepared by competent authorities upon matters connected with public health.

Sauk City. — Dr. H. G. Lachmund, late a resident here, but now in Germany, gives the following explicit and interesting account of sundry conditions affecting the health of the city: Our city and its vicinity have been suffering severely for some time past from Diphtheria, whereby we have to lament the deaths of many of our people. According to the statement of the Catholic priest on the opposite side of the river, not less than twenty-two funerals have been celebrated within ten weeks, the majority being those of victims to this disease.[1]

In the winter of 1865–66 we suffered from an extensive Diphtheritic epidemic; at that time I called the attention of our common council to the dreadfully filthy condition of the town, and the authorities at that time willingly and promptly carried out the proper sanitary measures, removing manure heaps, cleaning the streets and alleys, emptying and disinfecting overflowing cesspools and privy-vaults, causing the removal of slaughter-houses to beyond the municipal limits, and generally placing the town in good and cleanly condition. The beneficial effect of these steps was promptly

[1] How many new cases of Diphtheria originated among those in attendance upon such of these funerals as were held in public can never be known. clergymen of all denominations should earnestly dissuade their parishioners from having such public services in case of death from diphtheria or other *contagious* disease.

Extracts from Special Correspondence.

seen in the rapid diminution and speedy disappearance of the pestilence. Most unfortunately, however, the very last case was that of one of our councilmen who had supported me most energetically in demanding, and in the execution of the hygienic measures above detailed.

With the disappearance of the disease zeal for cleanliness slackened and gradually matters slipped back to the old standard, even slaughter houses moving into the village limits without opposition, and finally taking up their stand in the most thickly populated portions. To-day there are living upon an area of eighty acres more than one thousand people, who keep about three hundred cows with a proportionate number of horses, swine and chickens, and a disproportionate number of dogs. Taking this fact into consideration, and having due regard to the further facts that the sentiment of not a few among the residents is opposed to the maintenance of scrupulous cleanliness, that manure piles have again accumulated, that privy vaults are once more filled to overflowing, so that during warm weather the atmosphere is offensive by reason of the effluvia therefrom, and we frequently hear strangers remark that "the place stinks;" considering all this, there will be no difficulty in comprehending how it is that disease maintains its footing here among us.

A year ago I deemed myself justified in warning our village government that an outbreak of Diphtheria was imminent, and that proper hygienic measures should be carried out at once; no attention was paid to the warning, and inaction has remained the rule, even though fatal cases have been occurring among us ever since.

There is here a slaughter house, the owner of which lives not more than a hundred and twenty feet away from it; the building is floored with plank and under the floor is a hole for the reception of blood, the removal of which, the proprietor says, "is cared for every time." A three-years-old child, the daughter of a sister who was on a visit to this man at the time was taken down with Diphtheria but recovered. Soon after, his own daughter aged twelve, also contracted the disease, but recovered, to be again attacked six weeks later, recovering however, a second time. Next his son, aged ten,

Extracts from Special Correspondence.

was seized; at eight o'clock in the morning of the next day I found him in a very serious condition, and five days thereafter, he died. A second son, aged eight, was the next attacked, and died on the tenth day. Five days after his death, a third boy, aged six, was taken, and he also died on the sixth day of his illness. When the second of these cases came into my hands, I urged the necessity of cleansing and disinfecting the slaughter house and the privy; when the third case occurred I asked whether anything had been done and was answered in the negative, and I made the same inquiry, to which I again received a negative reply, on the appearance of the fourth case, the first that proved fatal. I was not called in to the fifth and sixth cases and cannot say whether anything was *then* done or not.

My conclusion decidedly is, that the disease first originated in the house where the six cases mentioned above occurred, and that by the action of the miasmatic atmosphere there, the Diphtheritic poison finally acquires a degree of concentration, and a power that no constitution could resist. The condition of the premises may be judged from the fact that when at last they were cleaned, one of the workmen employed upon the job was completely overpowered by the horrible stench and forced to discontinue work. I, myself, was at the time busy in my garden, situated in an adjoining block, with three lots intervening, and was sickened and obliged to quit work by the same cause. I think, moreover, that I risk little in attributing an attack of Diphtheria under which I personally suffered soon after, to the effluvia arising from that spot and its vicinity.

Shawano.— Dr. J. D. W. Heath writes to the following effect from this place: Since my appointment as health officer of this city, I have taken active measures for preventing the spread of Diphtheria, which has lately made its appearance among us, by placing Shawano in the best possible sanitary condition. The disease, however, prevails to a considerable extent; in several cases all the children in a family, nursing babes included, have died; it is almost needless to say that these little victims had been living under the most unsanitary conditions.

The first cases that came under my care were in a family that

had moved into a log cabin which had been standing vacant for five years previously; they had taken up their residence there but for a short time when Diphtheria broke out among their children, five in number, all of whom were attacked, one case proving fatal. During my absence from town for a brief season, the disease appeared in a family living within the city limits, and very soon thereafter in yet another household, also within the city lines. Neither of these families had any communication with the first mentioned, whose residence was five miles away, or with each other.

In spite of all the care that physicians can give to prevent contagion, and in spite of the vast amount of conclusive evidence of the contagiousness of Diphtheria, there are yet many who shut their eyes to the facts and proclaim that they "*don't believe that it is catching*," and who not only visit the sick freely themselves, but take their children with them — and wonder "how it could have happened," when the inevitable result of such conduct follows. Many here and many in the town of Richmond, where the mortality has been very great, labor under this delusion and act in this way. Another thing worthy of attention in considering the spread of the disease is, that in many instances where it breaks out in log-cabins or other one and two roomed structures, *sick and well live and sleep in the same apartment, sometimes even in the same bed.* In many of these dwellings it has proved extremely fatal, and what wonder? In a single case only the well members of a household were removed, two days after the appearance of the first symptoms, to a new shanty.

This was one of the families in which Diphtheria first appeared, and in which contagion could not be traced. I examined the well and the water used, with the following results: The well was situated thirty-four feet from an old disused privy-vault, and about as far from a new one; it was ten feet deep, planked up, and had recently been filled to the top with surface water. Its fluid contents held a large amount of organic matter in solution. Other wells were examined where the disease prevailed and the water was found equally bad. Herein, I think, lay at least a predisposing

cause; the heavy rains of early summer filled many cellars with water, leaving them in an exceedingly bad state. I have found by personal examination very many of death's hiding-places, which I have had scoured out thoroughly; our prospects were very good for a prolonged visitation from the enemy not long since, but now we hope that he may be kept away. One thing against us is the fact that many of our people are Germans and cannot read English; hence their only way of learning is that of sad experience.

Sheboygan. — Dr. J. J. Brown, of this city, sends a communication, originally printed in a local newspaper, from which we make the following extracts as having a more than local interest: The surface of our city is a bed of porous, sandy soil, everywhere underlaid by an impervious bed of clay. The rain that falls is readily absorbed by the sand, and remaining in its lower portions, constitutes our water supply. Where the city is not thickly settled, perhaps reasonably good water may be had, but in the central portions of the town the wells are not only shallow (the clay in some places coming within two or three feet of the surface), but they have, in their immediate neighborhood, numerous privy-vaults, cesspools, stables, etc., the drainage from which gives a very decided flavor to the water. A moment's reflection should satisfy any one that *such a state of things is dangerous*, that it may at any time be the means of spreading disease and death and desolation through many a home. A hot, dry season, causing low water in the wells, will concentrate the impurities therein, and then a single case of disease may act like a torch in the midst of the most inflammable material, and kindle a conflagration that shall consume many lives.

This state of things has been gradually growing upon us, and the evils attendant upon it have been constantly accumulating without notice, until they have reached a point where longer to neglect and to continue them is to violate directly the plainest sanitary law. In the absence of any regularly organized board of health, our people look to the common council for wholesome sanitary regulations, but the record of that body has not been especially worthy of commendation in this respect for some time past,

Extracts from Special Correspondence.

and the sanitary administration of our city government is wholly unworthy of a municipality whose people are second to no other community of the state in enterprise, intelligence and morality.

Let any one stand on the lake shore and observe the structure of the ground on which the city stands; let him note the sandy soil above and the solid, impervious clay below; let him note also the shallow wells and wet cellars, wherever the sandy stratum is thin, and the readiness wherewith water flows through that stratum from place to place; and finally, let him observe the character of the well water in places where the people and their privies are most closely congregated; no one doing this can fail to perceive the urgent need for a change. I know very well that every man thinks his own possessions perfect, and that every one considers that the water *in his well* is excellent, yet it is a fact, nevertheless, that every well in the city is a source of danger. May we not soon hope for better things? Let us substitute the dry earth closet for the privy vault, fill up the wells and draw our supplies of drinking water from Lake Michigan, and by so doing save many a life of value to the community, and keep many a home from being desolated.

Sheboygan Falls.— Dr. C. B. Cody writes from here as follows: There has been no notable increase of cases of Phthisis, but a very great one in the number of cases of Pneumonia and malarial disease, of which we have had more than for many years past. We have also had some cases of malignant Diphtheria, which has not been known here for years before, the mortality from which has been fifty per cent. This disease was imported by a young man who contracted it in a lumber camp, in which he had been working when it broke out, and where nearly every man had died. This lad also died within two hours of the time when he reached home, and his sister took the disease from him, and died within forty-eight hours thereafter. Four other fatal cases occurred in the building where these young people died and the one next adjoining it, within a few days, all the circumstances going to show the malignancy of the disease.

I am unable to assign any definite cause for the increase of Pneu-

monia and malarial disease above mentioned; it is true that we have had an unusually wet season, but that circumstance had little, if anything, to do with the causation of sickness.

Superior.— Dr. E. S. Gavreau gives this fact: Pulmonary diseases are prevalent here, especially among the half-breed Indians; their cause is generally deterioration of blood, aided by imprudence and exposure.

West Branch.— Dr. A. Shambaugh sends this cheering piece of information: People here are gradually learning how to prevent sickness by draining their grounds and purifying their dwellings. Physicians and laymen have alike become interested in this matter, and have helped and counseled each other to the same good end. Yet, though much has been done, there is abundant room for improvement, for we still have among us Diphtheria, Typhoid and Scarlet Fevers and Erysipelas, though in generally mild forms.

In connection with the foregoing extracts from communications from special correspondents, we present the following selections from letters from the clerks of

LOCAL BOARDS OF HEALTH,

in which will be found much of general interest; many facts which tend to explain the prevalence of disease in some localities, and suggestions for the improvement of public health. A most encouraging feature in prosecuting the work of the board is the growing interest shown from year to year on the part of the above-mentioned officers, to whom the secretary is indebted for many communications which have proven exceedingly useful, and for which he here returns sincere thanks. As in the preceding excerpts, the arrangement of these is in alphabetical order, but the names of the writers are not given, in deference to what is believed to be their general desire.

Anchorage.— Having taught school for many terms, I can testify *that the* elaborate paper in your last report, upon the condition of *our public schools*, contains nothing more than the truth, and I be-

lieve that if your recommendations were carried out, there would be a vast improvement.

I am convinced that very much of the restlessness and inattention, much even of what teachers sometimes attribute to willful mischievousness on the part of children, is really due to the discomforts arising from lack of pure air. Many of our school-houses are built seemingly in defiance of all sanitary laws.

We Americans, as a people, boast of our free *public* institutions, and are apt to be dazzled by their glare, while the *domestic* institutions — those which more nearly concern the welfare of the individual and the family — fail to receive the attention which is their due. I trust that the wise suggestions concerning home and school life, contained in the preceding reports of your board, will do something toward educating the people in the duty to themselves and their children, of providing cleanly and healthy homes and school buildings.

Afton.— We have had some cases of sickness that were attributable to the use of water from wells that had become very low and foul. Aside from these, our town has been unusually healthy.

Belle Plaine.— When I made my formal report to your board, I had a clean bill of health, but since that time we have had several cases of Scarlet Fever and Diphtheria. In the early part of the summer, we had excessively heavy rains, which produced a considerable amount of decaying vegetable matter. In my own neighborhood, I took the precaution to burn all such stuff, as soon as it was dry enough to do so,[1] and in this way I think that I promoted the health of the residents. At any rate, we had not a single case of disease, although it raged fearfully to the north of us, whole families there having been swept away.

So hard is it to convince people that Diphtheria is contagious, that they will not only have funeral services publicly held, but, in case of death from it, they will keep the body three or four days, till all the relatives can be gathered together; of course, these are

[1] A very wise proceeding. Were this generally done, the health of many neighborhoods would be benefited.— SEC.

liable to take the infection home with them, and in a few days others may be stricken down, to communicate the disease in their turn, and so the contagion spreads from constantly renewed centres, in ever widening circles. "It is something in the air," they say; "it makes no difference whether we associate with those who have it, or not! If we are to have the disease, we shall take it anyhow; and if not, we are safe anyhow!" Now, as a matter of fact, not a single case has occurred around here that cannot be traced to either attendance at a funeral, or direct contact with the sick. Another fact is, that where there is the most filth, there mortality is the greatest. In shanties and log cabins with low ceilings, without ventilation, having little light, with dark, damp cellars under the living rooms, the ground around the back door saturated with slops, generally a great deal of filth and garbage inside the house, and the inevitable swill barrel in the cupboard giving off its abominable odors — in such places as these, Diphtheria and fevers hold high revel.

Only the other day, in a neighboring town, a girl died from Diphtheria; the body was kept until all the friends could be assembled, and was then taken to another place and there buried with a good deal of ceremony. Now, in the town in which the interment took place, there has been no case of contagious disease for a number of years, and the people are a good deal exasperated at the idea of having been compelled to run so great a risk at the pleasure of any and every one, and the feeling is growing among them that the health officer of a town should have power to prevent such occurrences.[1]

[1] Diphtheria has been the scourge of this state for many months past, and so long as the lack of all precaution, well described by the above correspondent exists, it will continue to be so. The State Board of Health earnestly invites our citizens to heed such warnings, and to remember that the various local health boards have the fullest powers to do any and every thing necessary to prevent the spread of contagious disease. The people have it in their own power to put a stop to such performances as that above described. *Vide* extracts from Revised Statutes, published in reports of this *board*.

Extracts from Special Correspondence.

Bloomingdale.— My report contains nothing of value. How can it when our local board takes no interest whatever in health matters, neglecting to appoint even a health officer, though we have three resident doctors? Our town is generally healthy, though I can obtain no statistics.

Bonduel. — In a neighboring town Diphtheria is raging with fatal effect, and I think that it will increase greatly during the fall and winter, as nearly or quite all the funerals of those who die are public, and no precautions otherwise are taken against its spread.

Darlington.— Our town is in a generally healthy condition, but, as in most other places, great sanitary improvements might be made. There is much neglect in the matter of cleanliness, although we are certainly ahead of many towns in this respect. The most objectionable thing that is done here is to neglect the cleaning and disinfecting of cess-pools and privy-vaults in hot weather. In some parts of the city the stench is very bad, especially on sultry evenings. Gen. Bintliff, of your board, is very active in giving advice and doing whatever he can in the matter.

Edson.— Diphtheria, Scarlet Fever and Whooping Cough have all been rife in this locality; in some instances Diphtheria and Scarlet Fever have attacked the same individuals simultaneously, such cases being very fatal. In yet other instances Whooping Cough has attacked those convalescent from Diphtheria, and carried them off very rapidly. The doctors say that the severity of many attacks has been due to the lack of proper drainage, most of the cellars being wet, and to the want of sufficient ventilation in small, cramped bed-rooms.

Gibson.— We have no resident physician here, and bills for medical attendance range very high; from these two circumstances it happens that very many, especially among the poorer classes, when sick, call in no doctor, but trust wholly to the merits of some vaunted patent medicine, too often with most disastrous results. Diphtheria and Scarlet Fever are prevalent, both occasionally attacking one individual at the same time.

Grant.— Diphtheria has raged in the northwestern part of this town, but the local health board has done nothing to prevent its

Extracts from Special Correspondence.

spread. I notified the board of its existence, and advised the closing of the district school, but no attention was paid to the matter. The people are very careless, too, in going from house to house where the disease exists; some claim that "whoever is to have Diphtheria, will have it, anyhow," in spite of precautions! So things go on, and so diphtheria spreads.

Juneau.— Diphtheria was brought here by an individual coming from Fond du Lac; he was taken sick in a family resident here, whose children all contracted the disease, from which four of them died. Other relatives of the family also caught it, and thus the malady was spread through our town.

Kingston.— It seems very strange, indeed, to me, that we have not had some serious outbreak of disease in this locality, owing to the following circumstances: This is a low, wet, marshy region, with occasional sandy ridges, varying from two to fifteen feet in height above the water level; the marshes are usually covered the year round with dead, stagnant water, in which are found great numbers of small fish; so numerous are they, indeed, that it is very common for them to be caught in the cranberry rakes which the pickers use in gathering that fruit. During the fall of '79, these marshes became unusually dry, and a consequence of the drought was the death of the fish by thousands; but this was not all: many of the streams which contain larger fish also became low and dried up to a great extent, and the fish in them gathered in great numbers in the pockets and sink-holes in the beds of the streams; the boys, under these circumstances, amused themselves by frequently visiting these pockets and by catching and killing the fish in large quantities. The larger part they left to decay on the banks, and the stench arising from dead fish on the marshes and along the streams was horrible. What, with these causes and the amount of rotting vegetation laid bare, it seems to me a wonder that we escaped a pestilence.

Kossuth.— Diphtheria and Scarlet Fever have prevailed here to some extent, but, so far as I can learn, few cases have proved fatal. There is little if any doubt that in very many instances these diseases were aggravated, if not caused by the use of bad water for

Extracts from Special Correspondence.

drinking purposes, and by lack of cleanliness both of person and dwelling.

Lawrence.— I notice that there is more Diphtheria where privies are close to the water supply. Where it has proven most fatal, the dwellings were on sandy soil, and the privies were nearer to the wells, etc., than in any other places in the town.

Lincoln.— Most of the houses around here are log houses, the rooms are small, and there is generally a cooking stove in the room where all the family eat and sleep. There is usually a cellar, or a hole called by that name, where potatoes and other vegetables are stored through the winter. How such a way of living can be healthful, I can't see. Those who live away from streams and lakes generally have the best drinking water.

Luck.— There are several points in this town to which I have called attention, which threaten the health of the people, and, if not remedied, will, in due time, bring forth a crop of disease. First, I note the absence of privy accommodations from many houses whereby filth is left in all manner of unsuitable places. Our people are, however, too neat and cleanly in their dispositions to tolerate any such state of things very long, and they are very rapidly remedying this matter. Secondly, the cattle yards and manure heaps are much too close to the houses and their water supply, and this is bettered very slowly if at all. Thirdly, the settlers hereabout use unwholesome water from swamps, creeks, and shallow wells — water brackish to the taste and repulsive in appearance. Still, many who are possessed of time and means have dug good wells during the past year, and it is to be hoped that the evils arising from this source will disappear in a comparatively short time, especially as it is coming to be understood that good water may be had at a moderate cost.

To the second and third of the above named causes is to be attributed, I think, an outbreak of Typhoid Fever in a neighboring town. Yet a fourth cause of sickness is to be found in the many swamps in our vicinity, the influence of which is felt in dry seasons; I have noticed at such times that there seems to be an unwholesome atmosphere surrounding them, arising probably from

Extracts from Special Correspondence.

decaying vegetable matter. Were these swamps properly drained, which might readily be done at moderate cost, and the other matters herein alluded to properly cared for, our locality would be one of the most healthy in any part of Wisconsin.

Monroe.—I have made as full a report as I could, but cannot say anything about diseases and their causes. We had a health physician appointed two years ago, but he refused to act unless reasonable compensation be allowed him; he says that he has already done considerable work without remuneration, but that if he has a competent appointment and pay, he can and will open up some nuisances which have long been eye and nasal sores to the community, as well as some others that are more hurtful though less prominent.

We are in this village cursed with some poison breeders which are of such nature that no one likes to meddle with them except in discharge of plain duty. One member of our board does not wish to stir unless the others are ready also, and so things hang. I wish that your board could take steps that would lead us to some decided and beneficial results.

[The case above described is a very common one, and one moreover which may easily lead to serious trouble. No physician can give the time and skill necessary for the proper performance of the duties of a health officer without adequate compensation therefor, nor should any man be expected to do so. Neither will any honorable man assume an authority which has not been placed in his hands in a regular and legal way. A quasi appointment, made two years ago and probably not subsequently renewed in any way, is wholly inoperative to-day, and no one can be justly censured for declining to act officially in any capacity, especially in one involving such important interests as that of health officer, under such circumstances. Let the town board, acting as a board of health, appoint unmistakably and unequivocally a competent man as health physician, and pay him a fair salary for his services, requiring him to put the town in good sanitary shape, and supporting him in the exercise of the authority necessary in so doing. It will be found *in the end* a wise economy, and one that will save the town as a

Extracts from Special Correspondence.

whole, and its citizens as individuals, many times the amount expended, while neglect in doing so will probably, almost certainly, result in the loss, not of money alone, but of health and life in addition thereto.— SEC.]

Neillsville.— The particulars of the Typhoid cases occurring here are as follows: A family composed of father, mother and seven children all lived and slept in two small rooms, wholly without ventilation. The sickness began with the children, two of whom died; the mother and a young woman who waited on the sick were also attacked, but finally recovered. The physicians regard this as being a typical instance of poisoning from over-crowding and bad, or rather no ventilation. We have had some cases of Scarlet Fever, but they presented no features of special interest.

Northfield.— The principal cause of sickness in this town is, I think, to be found in numerous small, wet sloughs into which the waters of many springs flow, forming sinks which receive filth in various forms, and often look as though kerosene or other oily or greasy substance had been poured into them; the odor emitted from them is in many cases *vile*, and cannot be conducive to health. Very many of our people have wet cellars.

Perry.— Could something be done to compel school districts to provide more suitable out-buildings, a standing disgrace to most of our public schools would be wiped away. When I was first elected as district clerk, some dozen years ago, the first thing I went for was to have a privy built; I knew no better then than to have a large building with a partition in the middle, but even this was a vast improvement on the plan which had prevailed up to that time of "all faring alike in the woods." A year or two later I discovered that my plan was a very poor one; the partition had been so constructed that it did not reach the roof, and thus opportunity was given for throwing various things from one compartment to the other; the boys also took advantage of knot-holes and chance crevices which they enlarged with their jack knives, and finally the green lumber used shrunk so much that the whole structure had to be battened up.

I brought the matter up before the board several times and was

Extracts from Special Correspondence.

laughed at for my pains, but I persisted and at last succeeded in having separate buildings for the sexes on opposite sides of the yard. Even yet, however, this school house is the only one in the town that has even an approach to decent privy accommodations, and this, though we have some very fine school buildings for a country town.

We have one that cost $800, but the outhouse attached to it makes me ashamed of the town whenever I pass it; it is absolutely worse than the brush; fancy a small affair, six by eight feet, not four rods from the school house and facing the high road, having a partition in the middle, and the *doors side by side!* I blush for my town and for my fellow-citizens who can pass so carelessly over a matter of such prime importance upon the plea of the man quoted in your report that "the children are young."

As regards wet cellars, this season for the first time, I have heard of many, and, curiously enough, the houses on the highest land are the worst off in that particular.

Should I undertake to point out the worst defects in our farmers' habitations, I should say that the first is in the ventilation; fresh air is not as plentiful as it might be in them, considering its cheapness. Next, I am afraid that the water supply is seldom as pure as it should be, but I don't think that the proximity of privies and wells has anything to do with it; barn yards and manure heaps certainly are too close to the springs and wells that furnish the family supplies of drinking water in some cases, and there are some persons who make use of unfiltered cistern water.

Princeton. — The last report of your board contains much that is excellent and worthy of close attention. The papers on schools especially should have the widest possible circulation. Having called attention to the condition of school privies throughout the state, can you not now do the same service for the conveniences provided at railway stations, and the deplorable lack of similar public accommodations elsewhere where they are needed? In *Paris* you may find "*cabinets d'aisances*," properly kept and open *to any passenger* on payment of a very trifling fee — one cent or *thereabouts* — but here we have nothing of the sort except at rail-

road stations and similar places, and the condition of these is too often simply disgusting. At some of the larger stations they will finish up a privy, i. e., so far as painting it externally, and perhaps internally, in very good style, is concerned, but thereafter nothing is done in the way of keeping it decently clean, or of preventing obscene inscriptions on the walls. One or two stalls are generally kept under lock and key for the special use of the station agents and other *employes*, but the remainder is given over to nastiness — no cleaning is ever done, no disinfection ever attempted. No man around the building, no laborer, brakeman or section-hand could be induced to undertake such a duty; they would strike in a body first. Why should men display such foolish squeamishness in this direction, when in hundreds of other instances, far less important, they show none whatever?

Typhoid and kindred diseases are the last arguments of Heaven against uncleanliness, and perhaps we should "rejoice with trembling" that they are sometimes brought to bear.

Sheboygan Falls.— We have had sixteen cases of Diphtheria, nine of malignant type. The disease was brought here by a young man who came from the northeastern part of the state. By careful isolation, it was confined to two families, but these two suffered severely, five cases out of the nine above mentioned proving fatal.

Stevens Point.— We had very high water here last June, and there are yet many stagnant pools that should be drained or filled up. Of course these have much to do with the sickness prevailing, but, as we have no street funds in our treasury, nothing will be done with them.

Trimbelle.— "The people perish for lack of knowledge." As an instance, during the winter of 1879–80, there was considerable Diphtheria in the western part of this town; during the following summer I learned that it had been confined to a cluster of Swedish houses and had been very fatal; the doctor who had attended the greater part of the cases told me that the mortality was confined to certain houses, which drew their water supply from one source, and that on examination, he found this source contaminated by the washings from a dung-heap; the physician induced them to make a

change and obtain their drinking water elsewhere, which being done, the disease disappeared.

Contaminated drinking water is in my opinion responsible for a vast amount of sickness, in this vicinity, at least. While making my rounds as census marshal, I found it hard to get a decent drink. Want of proper drainage about the house, and slops and garbage around the back door, the odors from which are mingled with those from the pig-pen and cattle-yard, must also come in for a share of the blame. So long, however, as people resent any interference with such "personal affairs," and show their resentment at the polls, we can't look for anything much better. A plain, vigorous pamphlet, setting forth the methods of rendering the farm house a healthful place of residence, and showing how farmers and farmers' families are poisoned by unsanitary surroundings, published by the State Board of Health, and widely circulated among our rural population, might be of much service.

Washburn.— In my opinion very many cases of sickness are caused by the want of proper sanitary conditions, as for example, the lack of cleanliness in privies, cess-pools, drains, etc., the proximity of manure heaps, pig-pens, and the like to dwellings, the failure to remove dead animals in good season, and neglect in other similar matters. If it were not for the provision made by nature for disposing of noxious effluvia and gases, arising from these abominations, sickness would be far more frequent than it now is.

Wautoma.— Whooping Cough was generally spread all over the town by the agency of the public school, into which it was introduced in the usual way [by some pupil just convalescent from, or just developing the disease, or by some infected garment].

Winfield.— Our local board has never taken any action and seemingly never intends to take any. We are sometimes scourged by Scarlet Fever, which spreads simply because no steps are ever taken to prevent it from spreading.

Worcester.— In the event of an epidemic of any kind, we are very much exposed. In the immediate vicinity of the village of Phillips, there are numerous swamps where some little drainage has been done, but there is little if any danger to be apprehended from

Extracts from Special Correspondence.

them. At the foot of the village, there are three lakes, Elk lake being the largest, all which are tributary to the Chippewa river. To facilitate log-driving, several dams are thrown across the river at this point which were kept closed for a long period of time, and finally opened during the hottest weather, and the water was suddenly drawn off. One result of this proceeding was the killing of the fish in large numbers, and their being left to putrify along the banks of the lakes and the river. The stench from them and from the rotting vegetation, also laid bare at the same time, was terrific, and fears were entertained lest serious sickness should result. Providence favored us, however, and we escaped for that time, but can we stand a repetition of the same performance and feel safe?

[From a report made by Dr. J. G. Meacham, Jr., to the common council of the city of Racine, we make the following extracts; they have a more than local interest inasmuch as they go to confirm statements heretofore made in the reports of this board, and as there are many other cities in Wisconsin where a state of things exists that is equally prejudicial to health and life.]

A portion of the first ward of the city of Racine is used mainly for railroad and manufacturing purposes, and but few families live there. In the remaining part, whose area is not over sixty acres, are found one hundred and forty-one wells which supply water for drinking and culinary purposes. Of these, two are driven wells; six are dug down to the depth of about thirty feet, from which point an augur-bore descends some forty-five or fifty feet further, making a total depth of seventy-five or eighty feet; six others are deep wells, dug in the usual way to the depth just mentioned, and all the remainder are the common shallow wells, ranging in depth generally from twelve to twenty feet. A few have the upper three feet curbed with brick laid in water-lime, but generally no precaution exists against the leaching in of surface water. Some are furnished with pumps of different kinds, the majority being of wood; many of these are in poor condition, the wood being rotten, while the platforms are decayed, loose and open, allowing abundant entrance to bugs, worms and surface drainage.

The wells are placed with great uniformity, sixty or seventy feet

Extracts from Special Correspondence.

back from the streets, but their distances from privies vary considerably. Often they are close by, in one instance the space of eight feet only intervening; more than fifty are to be found which are within twenty feet of privies, and in several places I have found drains, or places for surface slops, within six or eight feet, *once within thirty inches.* The average distance from the nearest source of contamination scarcely exceeds thirty feet, and it is not uncommon to find a slop-sodden soil which from lack of care has become nearly if not quite as great a source of possible contamination as a privy or a cesspool.

The soil in most of the settled portion of the ward is a sandy loam, well suited for the rapid absorption of every kind of fluid. Rain leaches into the privies and cesspools, dissolving the matters there fermenting and putrefying, and carries them with it as it percolates through the deeper sand; water from the kitchens, containing vegetable and animal refuse, from the wash-rooms and laundries, containing soap and excreta derived from soiled clothing, finds its way its way into the soil, and to this the drainage from stables and cow sheds is added. * * * On an average, each person passes daily about thirty-four ounces of solid or liquid excreta. The population of the first ward of Racine numbers eighteen hundred persons. Hence, there is a daily amount of three thousand eight hundred and twenty-five pounds, and an annual quantity of considerably more than six hundred tons of such matter produced in this district by the people alone. It is very difficult indeed to make any estimate which shall approach accuracy of the amount of excreta produced from stables, etc., of the other refuse, of slops and kitchen water constantly accumulating, but it must be very large, probably six times the sum above mentioned; this added to the human excreta would make a total of more than four thousand five hundred tons of filth annually deposited upon this sixty acres, all of which is produced within this area. And besides all this, a large amount is brought into the ward from outside sources; for wherever business centres itself, there filth accumulates, and of the *sum total of this* I can make no estimate whatever. Of course a *portion of the* whole accumulation is carted away, as, for instance,

Extracts from Special Correspondence.

manure heaps and coarse vegetable refuse; the air purifies a certain amount and another part is oxidized in the soil; but notwithstanding these methods of destruction and removal, enough remains to render it certain that the sixty acres contained in the first ward constitute a very thoroughly manured farm.

I have counted forty-one stables, containing one hundred and thirty horses and fourteen cows, two hundred and twenty-six privies, twenty-five cess-pools, twenty-six old stopped-up drains, and at least fifty places where the surface was kept sodden by slops, dirty water, garbage and refuse of all kinds. Note that these three hundred and sixty-eight are existing and in use at this present time, and remember also that for thirty-five or forty years, in this same grouud, cess-pools have been filled in and new ones dug, privy vaults covered over and new ones made, the contents of the old being rarely removed; a little earth being thrown upon them year by year, as the surface settled down, until, as I have ascertained, in certain localities it is almost impossible to dig any kind of hole without coming upon some of these ancient remains, while frequently three or four are found in excavating an ordinary cellar! *And our wells — what of them?* Placed among these accumulations of filth, they become the receptacles of fluids by which they are contaminated, and their water rendered unfit for use. A proof of the ease with which water from the surface finds its way into wells is given by the following fact: Last summer, a small fountain jet from an artesian well was allowed to flow continuously, the water soaking into the ground; a well that was dry, situated at least fifty feet to the north of the jet, soon had an abundance of water, while another well, fully one hundred feet east of the same jet, received water enough entirely to change its character. A common remark is that "the wells fill up when it rains."

I noted six pumps which had cloth bags tied over their spouts to act as strainers for the suspended matters contained in the water, and in five other instances the water was passed through a hand strainer before it came to me for examination. This matter consists of fragments of rotten wood from the pumps or platforms, shreds of vegetable matter, starch grains, flocculent particles of

undeterminable character, and mud; bugs and worms are not unfrequently pumped up. The water from several wells is no longer used because the people have discovered that it is not fit for use; a few wells furnish water which is used occasionally or after boiling. There are many wells, however, in constant use which ought not to be used a day longer. Prof. Hindley, to whom specimens of water were submitted for analysis, says of some of them, that "*while they may have some little value as manures, as drinking waters they are simply abominable.*"

The use of such water depresses the vital energies and places the human system in a fit condition for the reception (and development) of disease germs. Indeed it may be the vehicle by which germs are carried into the system which in some way or another and under proper conditions cause Diarrhœa, Dysentery, Typhoid Fever, Cholera or Diphtheria. Some of these diseases are occurring from time to time in the first ward, and why not from this very cause? The fact that they are not more frequent affords no proof that there is not danger, or that the danger is not constantly increasing. It is our duty to avert danger and to avert it now, which can be easily done. In a sanitary point of view, there is pressing need for a sufficient supply of pure wholesome water and such supply should be obtained without delay. Many a valuable life will be saved thereby.

Index.

INDEX.

A.

Acknowledgment to American Public Health Association..... xli
Contributors generally ix
Special correspondents..... 105
Acute disease in cattle..... 84
Afton, report from 133
Allen, Dr. H., communication from 120
Alma, report from..... 106
Anchorage, report from. 132
Anthrax 85
Armstrong, Dr. L. G., communication from..... 108
Arsenical poisoning, case of 107

B.

Bannister, Dr. C. B., communication from 109
Barnett, Dr. J. B., communication from..... 117
Bartholow on Preventive Medicine..... 8
Belle Plaine, report from..... 133
Belmont, report from..... 107
Bibliography of Diseased Meat..... 89
Billings, Dr. J. S., quotations from..... 9, 57
Blackboard Diagrams, proper size of..... 48
Black Death, mortality from..... 7
Black Plague, rise and ravages of..... 2
Bloomingdale, report from..... 135
Bonduel, report from..... 135
Boothby, Dr. E. L., communication from..... 110
Boscobel, report from..... 108
Bowditch on Sanitary Improvement..... 7
Bowels and bladder, importance of relieving..... 52
Braxy mutton..... 86
Brillion, report from..... 108
Brown, Dr. J. J., communication..... 130
Burning fluids, non-explosive..... 98
Byers, Dr. F. W..... 118

Index.

C.

Calisthenic exercises, description of..... 37
Calumet Harbor, report from..... 108
Camping out..... 27
Carbolite and carbon fluid..... 98
Chalk-dust in school room, prevention of..... 42
Change of employment as a recreation..... 24, 27
Charbon..... 85
Chicago, condemnation of meat in..... 88
Chimneys for kerosene lamps, absorption of light by..... 104
Chittenden, Prof. T. W., acknowledgment to..... xlvi
Article by..... 30
Cincinnati, condemnation of meat in..... 88
Circular to special correspondents..... xxxvii
town clerks and others..... xxi
Treatment in case of drowning (note)..... 51
Clerks of local boards, communications from..... 132
Cody, Dr. C. B., communication from..... 131
Colfax, report from..... 108
Committees of the board..... xv
Condemned meat..... 87
Consumption, affected by drainage..... 14
reasons for increase of, in Wisconsin..... xxxviii
reported prevalence of..... xxxvii
Contagious diseases, diminution of, in Milwaukee..... 70
management of, in Milwaukee..... 64
prevention of, in schools..... 59
tables relating to..... xxx, xxxi, xxxii
Contagion in pneumonia..... 118
Correspondence, special, extracts from..... 105
Correspondents, acknowledgments to..... xli
Counties reporting in full, list of..... xxiv
Cows, suggestions for keeping and feeding..... 112
Cysticercus..... 82

D.

Darlington, report from..... 135
Davis, Dr. S. M., communication from..... 123
Deafness, frequency of its occurrence..... 48
means of testing degree of..... 49

Index.

Decroix on glandered meat.... 87
Desk, proper relative height of 35
Devlin, Dr. J. B., communication from..... 108
Diphtheria, contagious character of..... xxxiv
prevalence in Wisconsin..... v
Diseased Meat, by H. P. Wenzel, M. D..... 74
Discipline, errors in..... 31
Drake, Col. G. S..... 94
Dry air, salubrity of..... 56

E.

Eagle, report from 109
Ear, injury to from bathing..... 50
proper treatment of 49
Eaton, Hon. J., quotation from..... xii
Edson, report from..... 135
Erb, Dr. E., communication from..... ... 109
Expenses of the board..... xlv
Experiments with dry air 58
with explosive fluids..... 98
Explosions, conditions of 99
losses caused by..... 100
Eyes, means of resting..... 47
prevention of injury to..... 44

F.

Faerber, Dr. J., communication from 111
Farmers' Club, synopsis of address before..... 124
Fond du Lac, report from..... 109
Fothergill, Dr., quotation from..... 16
Freedom, report from..... 109
French Burning Oil..... 98
Furniture, defects of school..... 54

G.

Gasoline, danger in using..... 98
Gavreau, Dr. E. S., communication from..... 132
General Health of the State..... v
General Hygienic Knowledge a Necessity, by H. P. Strong, M. D., 1
synopsis of paper on..... ix

Index.

General report of the board v
Geneva, report from 110
Gibson, report from 135
Gill, Dr. B. M., communication from 107
Gill, Dr. B. W., communication from 113
Glanders, contagion of 87
Godfrey, Dr. H. T., communication from xxxviii
Grant, report from 135
Grasmuck, Dr. L., communication from 119

H.

Hageman, Rev. J. W., acknowledgment to x
article by 18
Hall, Dr. S, communication from 124
Hammond, report from 110
Hazel Green, report from 110
Health Boards, Local xxxix
Officers, Local xli
Heath, Dr. J. D. W., communication from 128
Herrick, Dr. J. J., communication from 115
High test oils, safety of 101
Hildreth, Dr., on demand for petroleum 93
Hobbins, Dr. W., communication from 115
Hog Cholera 87
Hospitals, foundation of 2
Hubbell, Dr. S. B., communication from 116
Hygiene, definition of 4
in common schools 17
in State University xiv
Hyperion 98

I.

Illuminating oils viii
Inspection of kerosene, safety secured by 99
Instructions to health officers in Milwaukee 66

J.

Jacokes, Rev. D. C., plans of ventilation 42
Jenckes, Dr. J. L., communication from 110
Jewett, Dr., quotation from xii
Juneau, report from 136

Index.

K.

Kedzie, Dr., quotation from 101
Kerosene, by J. T. Reeve, M. D 91
accidents, dimunution of..... viii
adulteration of..... 97
choice of (note)..... 97
danger of using low grades of xvi
extensive use of..... 98
inspection act, requirements of..... xvi, 99
instruments for testing xviii
need for inspection of 97
qualities desirable in..... 101
rules for using..... 103
Kingston, report from... 136
Kossuth, report from..... 136
Kreutzer, quotation from... 87

L.

Lachmond, Dr. H. G., communication from..... 126
Lamps, proper care of..... 104
Lamp-wick, function of..... 101
kind needed for high test oils..... 103
Lawrence, report from 137
Leeds, report from. 111
Legal test oil 99, 102
Letheby's rules for choosing meat 77
Lewis' system of gymnastic games..... 87
Lewis, L. R., communication from..... 109
Library of the board, additions to..... xlii
Lincoln, report from..... 137
Linden, report from..... 112
Liquid gas 98
List of towns, cities and villages reporting..... xxiv
Local health boards, reports from..... xix
Lodi, report from 113
Lomira, report from 114
London, condemnation of meat in..... 88
Loring, Dr. E. G., on myopia..... 44
Luck, report from..... 137

Index.

M.

Madison, report from 115
Management of contagious diseases, by O. W. Wight, M. D..... 64
Mauston, report from 115
McComb, Dr. J., communication from..... 108
McKeeby, Dr. G. E., communication from..... 113
Meachem, Dr. J. G., communication from..... 122
Meachem, Dr. J. G., Jr., report on water of Racine..... 143
Meat a necessity 74
diseases affecting 75
putrifying, danger of using 76
Medford, report from..... 116
Medicine, effects of, on meat..... 87
Members of board, addresses of..... xv
Milk, means of securing purity of..... 112
Milwaukee, management of contagious diseases in..... xii
Mineral oils..... 101
Moisture of the air, amount of..... 56
Monroe, reports from 116, 138
Monteith, Dr. E., communication from..... 109
Moriarty, Dr. H. P., communication from..... 120
Murdock, Dr. O. N., communication from..... 119
Myopia, danger of 45

N.

Naphtha, danger in using 98
explosions, conditions of..... 99
Nearsightedness always a disadvantage 44
detection of..... 45
production of, by sewing machines..... 46
Neenah, report from..... 117
Neillsville, report from..... 139
New London, report from 119
New Richmond, report from 119
Non-explosive burning fluid..... 98
Northfield, report from..... 139
Notes concerning Health Board..... xi

Index.

O.

Oconto, report from 120
Oshkosh, report from 121
Oxford, report from 122

P.

Pappenheim, on Feeding Swine 87
Parasites in Meat, diseases produced by 80
Parkes' Hygiene, quotations from 6, 77, 87
Peckham, Prof. G. W., letter from xiv
Penalty for non-reporting contagious disease 66
removing placard from infected houses 67
Perpetual Fires of Ancient Times 92
Perry, report from 139
Petrolene 98
Petroleum, ancient well of America 92
constitution of complex 96
efforts at purifying 92
export of 94
formation, theory of 93
known to the ancients 92
means of collecting 93
product of 94
treatment of crude 95
value of as export, note 95
Petroleum World, figures from 100
Petry, Dr. M., on Carbuncle 88
Physicians required to report contagious diseases 66
Pittsburg, condemnation of meat in 88
Placards used in Milwaukee, forms of 67
Plague, death from 7
Play a necessity 28
Playground, oversight of 38
Pleuro-pneumonia 84
Position in writing as cause of deformity 33
Poisonous plants, effects of on meat 79
Preventable diseases, cost of xxxiv
statistics of xxx
Princeton, report from 140
Privy accommodations, lack of 51
Protection against diseased meat 88
Public funerals forbidden in contagious diseases 68

Index.

Q.

Quarantine, good effects of 111, 115

R.

Racine, report from 122
well water in certain parts of 143
Recitations, maximum length of 37
Rerceation as a sanitary agent, by Rev. J. W. Hageman 18
Recreation a necessity 28
methods of 24
synopsis of paper on x
Reedsburg, report from 123
Revised statutes, provisions of, concerning diseased meat 89
Reports from local boards, blank form of xxii
Rinderpest 86
River Falls, report from 123
Rood, Dr. C. A., communication from 123
Rosendale, report from 124
Rose oil 98
Rules for burning kerosene 103
for choosing meat 77

S.

Sabbath as a means of recreation 25
Safety gas 98
Sanitary police, institution of 3
Sauk City, report from 126
Sausage poison, effects of 79
Scarlet fever, communicability of 61
prevalence of v
deaths from vi
School houses, means of ventilating xi
School hygiene, etc., by Prof. T. W. Chittenden 30
synopsis of paper on xi
School officers, responsibility of xii
Schools, Milwaukee, diseases reported to principals 67
Secretary's report xv
Seiler, Dr. G., communication from 106

Index.

Septoline 98
Sexton, Dr. S, quotations from 49
Shambaugh, Dr. A., communication from 132
Sharples, quotation from 77
Shawano, report from 128
Sheboygan, report from 130
Sheboygan Falls, reports from 131, 141
Sickness, indications of, in children 60
Sins against health 18
Skipping rope, abuse of 39
Small pox, mortality from 7
prevalence of vi
of sheep 87
Spanish fever 86
Splenic apoplexy 86
Stalker, Dr. H. J., communication from 116
Steele, Dr. G. M., communication from 121
Strong, Dr. H. P., acknowledgment to ix
article by 1
Sunlight oil 98
Superior city, report from 132
Swinburne's method of ventilation xi

T.

Tape worm 82
Tardiness, wrong means of preventing 53
Tartar emetic in meat 87
Texas cattle plague 86
Theresa, putrid meat sold in 88
Tidy, Dr. M., quotation from 78
Trichina Spiralis 80
Trimbelle, report from 141
Typhoid fever, prevalence of vi

U.

University, hygienic studies in xiv

Index.

V.

Vaccination, importance of vii
in Milwaukee 69
Ventilation, devices for 41
methods of xi
mistaken means of 40
Vital statistics, cost of procuring xix

W.

Washburn, report from 142
Washington, condemnation of meat in 88
Water, effects of, on health 14
Wautoma, report from 142
Wenzel, Dr. H. P., acknowledgment to x
article by 74
communication from 114
West Branch, report from 132
Wet feet in schools, prevention of 55
Wight, Dr. O. W., acknowledgment to xii
article by 64
Winfield, report from 142
Winsor, Dr., quotation from 56
Wisconsin laws respecting children 62
Work of the board and the people xlvi
Worcester, report from 142

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